2013 Annual Report

Jeremiah W. (Jay) Nixon, Governor

Peter Lyskowski, Acting Director
Missouri Department of Health and Senior Services

Acknowledgements

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Communicable Disease Surveillance 2013 Annual Report

Note: This report does not include a summary of sexually transmitted diseases, Hepatitis, HIV, or environmental conditions.

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Missouri Profile

Missouri is 69,697 square miles and slightly more than half of the population live in or near the two major cities, St. Louis, Kansas City. Missouri became a state in 1821 and has 114 counties. Jefferson City is the capital. The major flows of traffic within the state are from the east to west along the Missouri valley and southward along the Mississippi.

Missouri is geographically diverse, with tilled plains in the north, Ozark Mountains in the south and the presence of the Mississippi Alluvial Plain in the southeast part of the state.

Missouri's economy is also highly diversified. While wholesale, retail trade, manufacturing, and agriculture play significant roles in the state's economy, service industries provide more income and jobs than any other segment, and include a growing tourism and travel sector. Missouri is a leading producer of transportation equipment (including automobile manufacturing and auto parts), beer and beverages, and defense and aerospace technology. Food processing is the state's fastest-growing industry. Missouri mines produce 90% of the nation's principal (non-recycled) lead supply. Other natural resources include iron ore, zinc, barite, limestone, and timber. The state's top agricultural products include grain, sorghum, hay, corn, soybeans, and rice. Missouri also ranks high among the states in cattle and calves, hogs, turkeys and broilers. A vibrant wine industry also contributes to the economy.

Population (2013)*	6,044,171	Percent of Total Population
Urban	4,510,173	74.5%
Rural	1,533,998	25.5%

Live Births	75,244
Deaths	57,256

Sex	Population	
Male	2,963,957	49.0%
Female	3,080,214	51.0%

Race	Population	Percent of Total Population
White	5,124,114	84.8%
Black	749,799	12.4%
Other	170,258	2.8%

Age Group	Population	
<1	75,244	1.2%
1-4	301,593	5.0%
5-14	784,137	13.0%
15-24	832,215	13.8%
25-39	1,151,925	19.1%
40-64	1,991,280	32.9%
65 and older	907,777	15.0%

District	Population	
Central	672,747	11.1%
Eastern	2,250,332	37.2%
Northwest	1,584,782	26.2%
Southeast	474,116	7.8%
Southwest	1,062,194	17.6%

Leading Causes of Death**:	Number of Deaths Reported	Percent of Total Deaths Reported
Heart disease	14,036	24.5%
Malignant Neoplasms	12,902	22.5%
Chronic lower respiratory disease	3,800	6.6%
Unintentional injuries	2,965	5.2%
Cerebrovascular disease (stroke)	2,913	5.1%
Alzeheimer's disease	2,018	3.5%
Diabetes Mellitus	1,477	2.6%
Influenza and pneumonia	1,347	2.4%
Nephritis and nephrosis	1,298	2.3%
Suicide	958	1.7%

*Unless otherwised noted, all percentages are based on 2010 population estimates.

**Not all causes of death are listed.

Data Provided by: Section of Epidemiology for Public Health Practice, Bureau of Health Care Analysis and Data Dissemination, DHSS.

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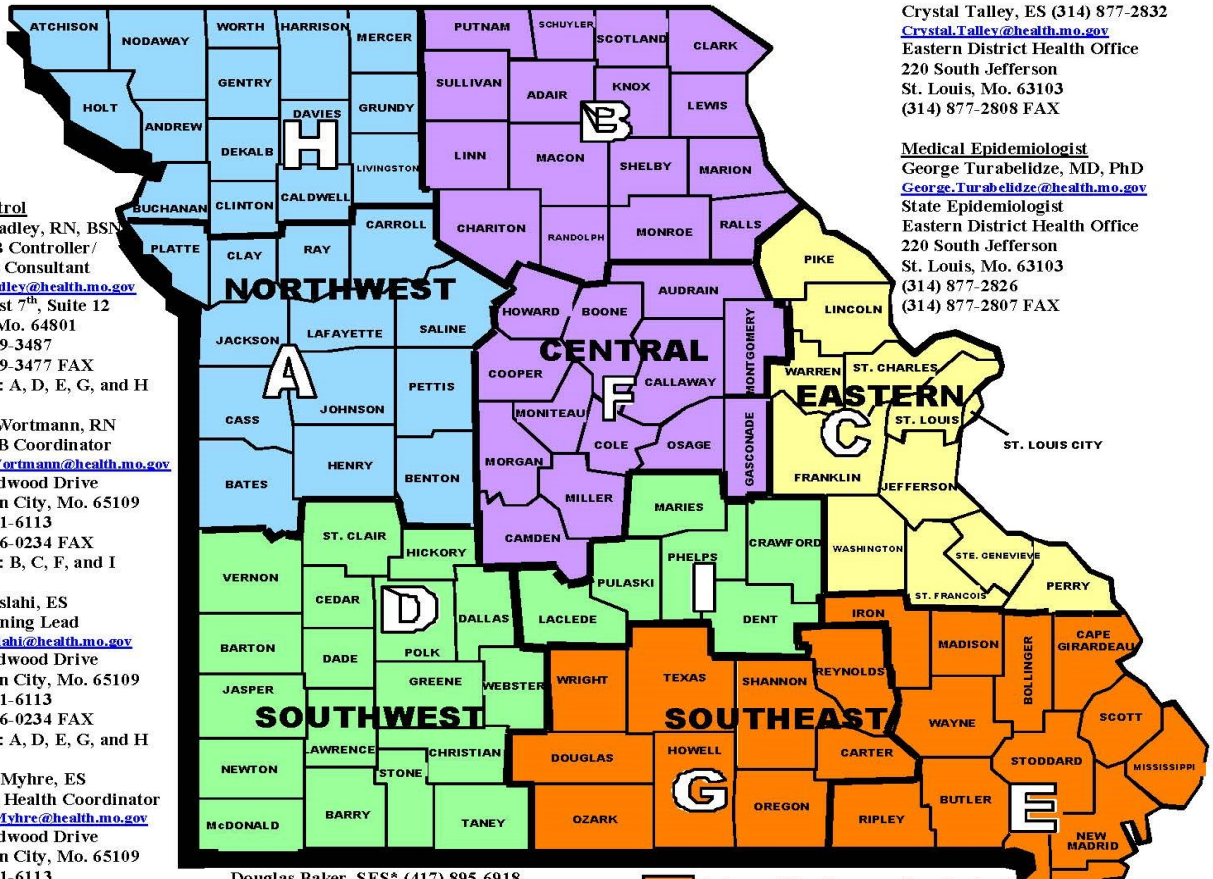

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Introduction

The Bureau of Communicable Disease Control and Prevention (BCDCP) provides prevention, intervention, and surveillance programs for ninety-one reportable communicable (or infectious) diseases and conditions of public health significance in Missouri. Many of these diseases are emerging infections (such as Multi-drug-resistant tuberculosis and Novel Influenza). The program also maintains a statewide disease registry and surveillance system (WebSurv) and performs analysis of morbidity to identify trends and risk factors for public health messaging. In addition to WebSurv, the Electronic Surveillance System for Early notification of Community-Based Epidemics (ESSENCE) is a statewide syndromic surveillance system that examines chief complaint data from hospitals, emergency rooms, over the counter drug sales, and information from the poison control centers. The BCDCP works closely with 115 local public health agency (LPHA) partners to protect Missouri's citizens and visitors from the threats of infectious diseases of public health significance.

BCDCP services include:

- Conducting epidemiological studies to investigate the cause, origin, and method of transmission of communicable diseases in order to identify and implement appropriate disease control and preventive measures, such as contact identification, testing, treatment, and source identification.
- Identifying communicable disease surveillance data needs, designing data collection processes/systems, developing and maintaining data systems and datasets, analyzing and interpreting data at regular intervals to track trends and provide regular reports on these analyses to support targeted interventions.
- Consulting with LPHAs, government at all levels, community organizations, hospitals, health care providers, private businesses, media, and others regarding diagnosis, and control measures for reportable communicable diseases and provide public health education as requested.
- Providing training and technical assistance/consultation to local health officials on disease investigations, control activities, and analysis/interpretation of data to prevent communicable diseases in their communities and rapidly respond to outbreaks.
- Providing community planning and rapid epidemiologic response for emergencies such as bioterrorism, pandemic influenza, and natural disasters such as flooding, earthquakes and catastrophic weather events.
- Providing the treatment of tuberculosis (TB) disease or infection, as well as tuberculin skin testing materials for use in extended contact investigations and assisting LPHAs with TB case management.
- Providing assistance to local health officials in the screening and treatment of public health conditions in newly arriving refugees.
- Collaborating with other programs within the Missouri Department of Health and Senior Services (DHSS), other state and federal agencies, and community-based organizations in emergency event planning and response.

The DHSS rule for the **Reporting of Communicable, Environmental and Occupational Diseases**, can be found at: 19 CSR 20-20.020. This report contains information only for those diseases and conditions that are addressed by the BCDCP. Information and statistics for HIV, STD, and Hepatitis can be found by clicking on Bureau of HIV, STD, and Hepatitis.

Introduction

Data used in this report were gathered from disease and condition reports made by medical providers, laboratories, hospitals, LPHAs, and others.

The information collected through 19 CSR 20-20.020 flows from the local public health jurisdictions to DHSS and on to the national Centers for Disease Control and Prevention (CDC). Data are linked to the national level through the CDC's National Electronic Telecommunications Surveillance System (NETSS). This information is critical for two reasons:

1. It enables public health agencies to act quickly to prevent the spread of disease, and
2. It provides an overall view of disease trends at the local, state and national levels. Analysis of these trends permits targeting of scarce resources where they are most needed and allows the assessment of the effectiveness in preventing and controlling disease.

There are limitations to the data provided in this report for the following reasons:

- sick people do not always seek healthcare; and,
- healthcare providers and others do not always recognize, confirm, or report notifiable conditions.

Therefore, reported cases may represent only a fraction of the actual burden of disease.

BCDCP is pleased to provide the following summary of data relating to over 49,014 cases that were reported during calendar year 2013. In addition to the contributors listed on the previous page, BCDCP would like to recognize the staff of Missouri's State Public Health Laboratory and the thousands of people in LPHAs, clinics, hospitals and clinical laboratories throughout Missouri whose disease reports and efforts constitute the basis for this document. Without vigilant reporting of disease, targeted and effective prevention and control measures cannot be implemented.

While this report was compiled by DHSS, please keep in mind that most of the public health workforce is in city or county health departments. Therefore, much of the work is at that level. The state, county, and city health departments and their private-sector partners work to promote health, protect against illness and injury, and render public health services to all people in Missouri.

A list of all reported notifiable diseases is located here. Hyperlinks to additional information are included throughout the document. The hope is that you find this report informative and useful. Your questions and comments are invited on this report, "Communicable Disease Surveillance 2013 Annual Report".

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Executive Summary

Annually, through the mutual efforts of the LPHAs and state partners, communicable disease investigation and control activities require an extensive amount of public health resources to be utilized. In 2013, a total of 49,014 conditions were reported, investigated, and entered into Missouri's communicable disease registry system known as WebSurv. The information contained within the WebSurv system is used to monitor trends at all levels, which include national, state, district, and local.

An important partner in communicable disease investigation and control efforts is the Missouri State Public Health Laboratory (MSPHL). The MSPHL provides technical assistance through consultations, both with LPHAs and their respective hospitals, as well as offering specialized testing services. About 5,000,000 tests (many required by law) are performed by the MSPHL each year. Approximately 406,920 mailing kits are assembled and distributed each year for the return of specimens from hospitals and private laboratories as well as city, county and district health offices. In addition to the analysis of Missouri resident samples, the MSPHL also tests non-resident samples when called upon by other states. Per rule 19 CSR 20-20.080 (Duties of Laboratories), laboratories are required to report the result of any test that is positive for, or suggestive of any disease or condition listed in 19 CSR 20-20.020. Laboratories are also required to send certain isolates to the MSPHL for epidemiological or confirmation purposes.

Although it is our hope that all isolates or specimens listed in subsection (3) of 19 CSR 20-20.080 be submitted to the MSPHL for further classification that is not always the case; percents listed in this report will reflect the number that were actually received and further characterized by the MSPHL and may be less than 100%, this is an artifact of submission of the isolates by outside laboratories to the MSPHL and not the ability of the MSPHL to do the testing. Further characterization of those isolates in part allows Missouri to continue participation in PulseNet, which aids BCDCP in the ability to more readily identify potential outbreaks both locally and nationally.

This document represents a summary of select diseases of public health significance in Missouri. The conditions selected for this year's summary include three gastrointestinal illnesses (campylobacteriosis, salmonellosis and shigellosis), four respiratory illnesses (influenza, pertussis, tuberculosis disease, and latent tuberculosis infection (LTBI)), one rash illness (measles), four arthropod transmitted diseases (ehrlichiosis, Q fever, tularemia and West Nile neruoinvasive disease (WNND)) as well as animal bites, rabies (animal and human), and rabies post-exposure prophylaxis (RPEP).

Statewide in 2013, a total of 647 cases of campylobacteriosis associated infections were reported, which was a 20.6% decrease compared to the previous five-year median. A seasonal trend for campylobacteriosis was noted in Missouri, with over half (55%) of the cases, occurring in the warmer months of May through September. At the present time, campylobacteriosis is not a nationally notifiable disease for 2013, which may have been why the decrease in reports may have occurred. Likewise, new testing methodology may have further contributed to decreased reporting since traditional methods of culture may not have been employed during this time.

The number of reported cases of salmonellosis in Missouri decreased in 2013. Statewide, a total of 847 cases of salmonellosis were reported, which was a 21% decrease in the number of cases as compared to the previous year. A seasonal trend for salmonellosis was noted in Missouri, with 68% of the cases occurring in the warmer months of May through October. In 2013, Missouri reported five *Salmonella* outbreaks; which included three multistate outbreaks.

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In 2013, shigellosis increased by 20% when compared to the previous year of 2012, but decreased from the five-year median by 60.8%. Statewide in 2013, a total of 89 cases of shigellosis were reported. A seasonal trend for shigellosis was noted in Missouri, with 74% of the cases occurring in the months June through November. Family clusters may have contributed to the increase over the previous year. Missouri has historically fallen below the national rates of shigellosis repeatedly with the exception being years where there are large regional outbreaks. That trend has held true for 2013. Only one outbreak of shigellosis occurred during 2013.

The 2013-2014 influenza season began September 29, 2013, and ended May 17, 2014. A total of 23,046 influenza cases were reported in Missouri. Influenza A was the predominant strain in Missouri accounting for 89.6% of reported cases. Nationally, the 2009 H1N1 viruses predominated overall during the flu season, though influenza B viruses became the predominant virus nationally later in the 2013-2014 season. Two influenza associated outbreaks were reported in Missouri during the 2013-2014 season, which was less than the seven influenza outbreaks reported during the previous season.

In 2013, pertussis decreased by 7.5% when compared to the five-year median data from 2008-2012. In addition, a late-summer through autumn trend for pertussis was observed this year in Missouri. A total of 559 cases were reported in 2013. There were three school-associated outbreaks and one athletic camp outbreak reported in 2013, which accounted for 13.4% of the cases. The decrease in cases may be attributed to increased vaccination coverage, earlier detection of cases limiting further spread and increased awareness of providers in terms of control measures.

Statewide in 2013, a total of 104 cases of TB disease were reported in Missouri; this was an increase of 6.1% when compared to the previous five-year median data from 2008-2012. There were 10 deaths; eight of the fatal cases of TB disease died during treatment and two were diagnosed at death. Fifteen percent of the TB disease cases in Missouri were considered preventable in 2013. No TB disease outbreaks were reported in Missouri during 2013, however after receiving information that five TB disease cases reported from September 2011 through December 2012 had association with a call in center in Eastern Missouri, an extended TB contact investigation was conducted at the facility. A total of 3,274 cases of LTBI were reported from Missouri in 2013, which is an increase above the previous year. This may be due to increased provider awareness and treatment initiation to prevent further development of active disease.

In 2013, measles increased by 200% when compared to the five-year median data from 2008-2012. International travel was associated with 100% of the cases. Missouri reported three measles cases in 2013. There was one multi-state outbreak that accounted for two of Missouri's measles cases. Nationally, measles is trending upward and Missouri is following that trend as well. Measles cases mostly involve individuals who are exposed to imported measles cases or were infected during a resulting chain of transmission and who were either unvaccinated or had unknown vaccine status. Lack of adherence to existing recommendations for measles prevention among groups at high risk (e.g., individuals who travel internationally), can spread measles to susceptible populations, including infants too young to be vaccinated and groups who routinely oppose vaccination.

In 2013, Missouri identified 398 cases of ehrlichiosis, reflecting a 105.2% increase from the five-year median of 194 cases. There were three deaths and more than half of the reported cases required hospitalization. The majority of cases are reported during the summer months, with a peak in cases typically occurring in the months of June and July. Of the 398 cases identified in Missouri in 2013, individuals aged 40 and older accounted for over 79% of the state's reports. Ehrlichiosis incidence will likely continue to

Executive Summary

increase in the next two decades, due to the advancing age of baby-boomers as well as people receiving immunosuppressive therapies or suffering from auto-immune or infectious conditions that weaken the immune system.

In 2013, Q fever increased by 700% when compared to the five-year median data from 2008-2012. An outbreak of Q fever was identified in Missouri, with the majority (80 %) of the cases occurring between June and December of 2013. The outbreak of Q fever, which involved 19 of the reported cases, was associated with a large dairy farm located in a rural part of Missouri with a low population density. Once *Coxiella burnettii* is present in the environment, eradication is impractical, if not impossible. Environmental contamination is suspected as a viable source for this outbreak.

Missouri typically leads the nation in the number of tularemia cases reported each year. In 2013, tularemia increased by 71.4% when compared to the five-year median data from 2008-2012. A total of 36 tularemia cases were reported in 2013 and a seasonal trend for tularemia was noted in Missouri with 83.3% of the cases occurring in the months of May through September. The increase in cases during this time may be the result of increased activity of the tick vector and persons participation in outdoor activities during these months. The national incidence rate has been remarkably stable over the last decade while incidence rate in Missouri indicates more variability.

In 2012, WNND increased by 317% (n=25) when compared to the five-year median data from 2008-2012. As with many other vector borne diseases, the number of cases reported each year follows a seasonal trend. In Missouri, the 25 cases were seen in the months of August, September, and October. The increase in cases observed in 2013, may be due to a number of factors such as greater circulation of the *flavivirus* in nature, increased awareness, greater access to diagnostic tests, better reporting, or to other unknown factors.

During 2013, 39 cases of animal rabies were detected in Missouri, compared to 28 cases the previous year, representing a 39% increase. The number of rabid animals detected each year varies according to several factors. No cases of human rabies were reported in Missouri in 2013.

A total of 378 persons were reported to have started the RPEP during 2013, which was almost 28.6% above the previous five-year median of 294 reports. Physicians should evaluate each possible exposure to rabies and, if necessary, consult with local or state public health officials regarding the need for rabies prophylaxis.

This is a brief summary of the information contained within the 2013 Annual Report. It should be duly noted that Missouri's partners at each LPHA contributed significantly to the investigation of communicable diseases, the continued surveillance of those diseases, and the control and prevention efforts undertaken with regard to communicable diseases in 2013. It is our hope that the information included in this report will be used in the pursuit of the overarching goal of protecting and improving the health of the citizens of Missouri.

Section A - Communicable Disease Surveillance

Disease Outbreaks

BCDCP maintains a database and provides on-site and technical assistance to the LPHAs on reported outbreaks. BCDCP also contributes to several national reporting systems such as the National Outbreak Reporting System (NORS), CDC's OutbreakNet Team, and PulseNet, national network of public health and food regulatory agency laboratories coordinated by CDC. These systems are used to rapidly identify potential outbreaks in order to implement effective measures to prevent illness and reduce the public health threat. BCDCP reviews outbreaks for lessons learned and any new information on disease reservoirs, modes of transmission, control strategies and provide data to CDC for national analysis.

Reported Outbreaks by Disease or Condition, Missouri 2013

Disease or Condition	Number of Outbreaks
Gastrointestinal	
Acute Gastrointestinal Illness - etiology unknown	15
Cyclosporiasis	1
E. coli O157:H7	3
E. coli O26	1
E. coli O111	1
E. coli O121	1
Norovirus	24
Salmonellosis	5
Shigellosis	1
Total	52
Vaccine Preventable	
Pertussis	4
Measles	1
Total	5
Respiratory	
Influenza	5
Mycobacterium	1
Total	6
Other	
Fifth Disease	1
Hand, Foot, and Mouth Disease	2
Q Fever	1
Rash (unknown agent)	1
Scabies	5
Total	10
Total Outbreaks	73

Diseases of Note

There are several notable decreasing and increasing disease trends as reflected in the 15 year report.

Decreasing Trends:

- Campylobacteriosis, with 647 cases reported in 2013, continued to decrease with a reduction of 20.6% from the 5-year median 2008 to 2012. There were (0) reported outbreaks in 2013. For additional information, click here.

Increasing Trends:

- Ehrlichiosis and anaplasmosis, with 398 cases reported in 2013, increased 105.2% from the 5-year median 2008 to 2012. There were (0) reported outbreaks in 2013. For additional information, click here.
- Q fever, with 24 cases reported in 2013, increased 700% from the 5-year median 2008 to 2012. There was one outbreak reported in 2013. For additional information, click here.

Section A - Communicable Disease Surveillance

Comparative Statistics, Reported Diseases and Conditions, Missouri 2013

Condition and/or Disease	Case Count	5-Year First Quartile	5-Year Median	5-Year Third Quartile	Percent Change from Median	Rate per 100,000
Acute Gastrointestinal Illness	2,356	2,710	3,191	3,405	-26.2%	39.1
Adverse Reactions, Vaccinia Vaccination	1	0	0	0	N/A	0
Animal Bites	6,970	6,638	6,917	6,969	0.8%	115.7
Botulism Infant	1	0	1	2	0%	0
Brucellosis	2	0	1	1	100%	0
Campylobacteriosis	647	770	815	919	-20.6%	10.7
Chlamydia	27,328	25,868	26,049	27,835	4.9%	453.8
Coccidioidomycosis	17	11	15	17	13.3%	0.3
Creutzfeldt-Jakob Disease (CJD)	13	8	8	8	62.5%	0.2
Cryptosporidiosis	210	195	239	495	-12.1%	3.5
Cyclosporiasis	5	0	0	1	N/A	0.1
Dengue Fever	5	3	5	6	0%	0.1
E Coli Shiga Toxin Positive	154	77	131	150	17.6%	2.6
E. Coli (All)	276	153	236	282	16.9%	4.6
E. Coli O157 H7	122	76	105	122	16.2%	2
Ehrlichiosis & Anaplasmosis (All)	398	167	194	227	105.2%	6.6
Giardiasis	244	344	426	468	-42.7%	4.1
Gonorrhea	7,546	7,159	7,802	7,889	-3.3%	125.3
HIV Disease	462	536	540	585	-14.4%	7.7
Haemophilus Influenzae, Invasive	95	72	80	82	18.8%	1.6
Hemolytic Uremic Syndrome	13	13	18	18	-27.8%	0.2
Hepatitis A Acute	9	21	27	30	-66.7%	0.1
Hepatitis B (Pregnancy) Prenatal	145	136	138	141	5.1%	2.4
Hepatitis B Acute	61	47	48	60	27.1%	1
Hepatitis B Chronic Infection	391	248	278	328	40.6%	6.5
Hepatitis C Acute	6	2	4	6	50%	0.1
Hepatitis C, Chronic Infection	4,875	4,722	4,842	4,921	0.7%	81
Hepatitis E Acute	1	0	0	1	N/A	0
Influenza Death lt 18 Years	1	0	1	1	0%	0
Influenza***	23,046	17,739	20,474	30,567	12.6%	382.7
Legionellosis	77	57	65	69	18.5%	1.3
Leptospirosis	2	0	1	1	100%	0
Listeriosis	2	11	12	14	-83.3%	0
Lyme	3	5	8	10	-62.5%	0
Malaria	6	14	19	21	-68.4%	0.1
Measles	3	0	1	3	200%	0
Meningococcal Disease	10	16	23	26	-56.5%	0.2
Mumps	8	8	10	11	-20%	0.1
Pertussis	559	561	604	815	-7.5%	9.3
Q Fever (All)	24	3	3	3	700%	0.4
Rabies Animal	39	29	63	64	-38.1%	N/A
Rabies Post Exposure Prophylasis	378	259	294	345	28.6%	6.3
Rocky Mountain Spotted Fever	245	270	278	315	-11.9%	4.1
Salmonellosis	847	764	843	900	0.5%	14.1
Shigellosis	89	182	227	1,046	-60.8%	1.5
Staph Aureus VISA	139	1	1	8	13800%	2.3
Strep Disease, Group A Invasive	125	97	129	142	-3.1%	2.1
Strep Pneumo (All)	147	131	134	140	9.7%	2.4
Strep Pneumoniae, Drug-Resistant	116	91	93	105	24.7%	1.9
Strep Pneumoniae, lt 5 Years, Invasive	31	35	40	41	-22.5%	0.5
Syphilis, Primary and Secondary	251	152	157	173	59.9%	4.2
Tick-borne Diseases	682	443	493	572	38.3%	11.3
Toxic Shock (Staph) Syndrome	1	2	2	4	-50%	0
Toxic Shock (Strep) Syndrome	1	1	2	2	-50%	0
Tuberculosis	104	89	98	107	6.1%	1.7
Tuberculosis Infection	3,274	2,575	2,601	3,393	25.9%	54.4
Tularemia	36	18	21	21	71.4%	0.6
Typhoid Fever	1	2	2	3	-50.0%	0
Varicella (Chickenpox)	229	388	488	573	-53.1%	3.8
Varicella (Chickenpox) Death Resulted	1	0	0	0	N/A	0
Vibriosis	5	1	3	5	66.7%	0.1
West Nile Fever	4	0	3	3	33.3%	0.1
West Nile Virus Neuroinvasive Disease	25	5	6	12	316.7%	0.4
Yersiniosis	12	8	10	13	20%	0.2
Zoonotic Diseases	719	470	525	613	37%	11.9

**Not a reportable disease in at least 3 of the last 5-years. The count mean of the years reported is used in this situation if available.
***Influenza is reported based on the Influenza Season Year. 2013 includes Weeks 40 to 52 of 2013 and Weeks 1 to 20 of 2013.
Data Source: WebSurv.

Section A - Communicable Disease Surveillance

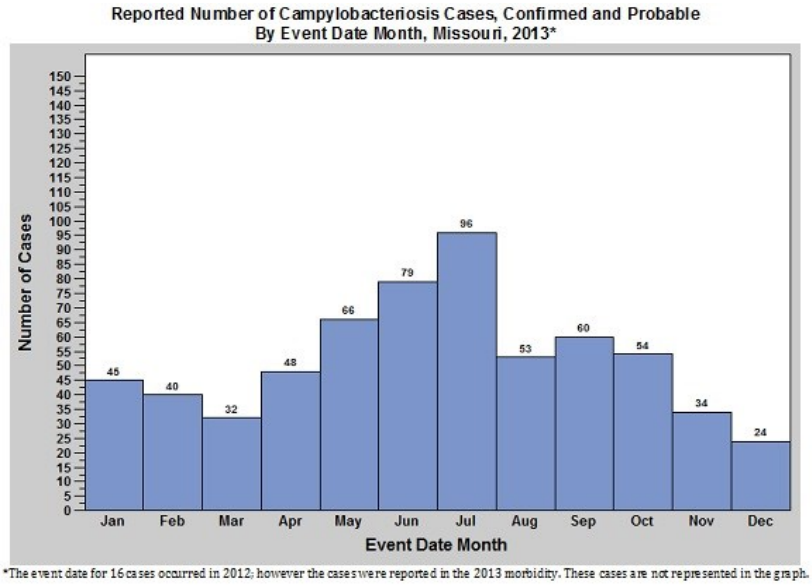
Campylobacteriosis

2013 Case Total 647 **2013 Incidence Rate 10.7 per 100,000**
2012 Case Total 567 **2012 Incidence Rate 9.4 per 100,000**

Campylobacteriosis is an infectious disease caused by a bacteria called *Campylobacter*. *Campylobacter* is one of the most common causes of diarrheal illness in the U.S. Most cases of campylobacteriosis are associated with eating raw or undercooked poultry or from cross-contamination of other foods by these items. Most cases occur as isolated, sporadic events, not as part of recognized outbreaks. Outbreaks of *Campylobacter* have most often been associated with unpasteurized dairy products, contaminated water, poultry, and produce. Domestic animals, including dogs and cats can also be infected, and be a source of infection in some persons. The organism is not usually spread from one person to another, but this can happen if the infected person is producing a large volume of diarrhea. Most persons infected with *Campylobacter* develop diarrhea, fever, and abdominal cramps two to five days after exposure to the organism, but onset of illness can range from one to 10 days after exposure. The diarrhea may be bloody and can be accompanied by nausea and vomiting. Some infected persons do not have any symptoms. Most people who get campylobacteriosis completely recover without any specific treatment within two to five days, although sometimes recovery can take up to 10 days. Rarely, *Campylobacter* infection results in long-term consequences. Some people develop arthritis. Others may develop a rare disease called Guillain-Barre syndrome that affects the nerves of the body beginning several weeks after the diarrheal illness. In persons with compromised immune systems, *Campylobacter* occasionally spreads to the bloodstream and causes a serious life-threatening infection. For more information on campylobacteriosis visit: http://www.cdc.gov/nczved/divisions/dfbmd/diseases/campylobacter/.

Missouri Incidence: In 2013, campylobacteriosis decreased by 20.6% when compared to the five-year median data from 2008-2012. In addition, a seasonal trend for campylobacteriosis was noted in Missouri, with over half (55%) of the cases, occurring in the warmer months of May through September (n=354).

Persons with campylobacteriosis ranged in age from two weeks to 99 years, with a median age of 38 years of age. The highest age specific incidence rates (IR) per 100,000 population occurred among children less than one year of age which was 34.5 cases, followed by children one to four years of age which was 21.7 cases. The highest proportion of cases occurred in the Eastern district 37.2% (n=241) resulting in an IR of 10.8 cases per 100,000 population. However, the highest district IR occurred in Southeast which was 24.9 cases per 100,000 population (n=118). Central was 11.6 cases per 100,000 population (n=78), Southwest was 11.1 cases per 100,000 population (n=117), and Northwest was 5.9 cases per 100,000 population (n=93).



*The event date for 16 cases occurred in 2012; however the cases were reported in the 2013 morbidity. These cases are not represented in the graph.

Females accounted for 45% of the cases, 16.7% (n=108) of the cases were hospitalized[¥] and there were no deaths[¥] reported in 2013.

Section A - Communicable Disease Surveillance

Campylobacteriosis - continued

The race specific IR was higher for whites with 9.3 cases per 100,000 population (n=474).

The most common *Campylobacter* species is *C. jejuni* which was identified in 133 of the reported cases. Other species reported with one case per species were *C. coli jejuni* (hippurate negative), *C. gracilis*, and *C. upsaliensis*. The remaining cases did not have a *Campylobacter* species identified or reported.

Clinical isolates of *Campylobacter* identified by laboratories are not required to be submitted to the Missouri State Public Health Laboratory for confirmation or identification and there was no outbreaks of campylobacteriosis reported in Missouri for 2013. In addition, the Centers for Disease Control and Prevention (CDC) did not report any multistate *Campylobacter* outbreaks for 2013.

Campylobacteriosis
Comparative Statistics by Socio-demographic Category, Missouri 2013[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	291	45%	9.5	398	-26.9%
	Male	353	54.6%	12	440	-19.8%
	Unknown	3	0.5%	N/A	0	N/A
Race	Black	31	4.8%	4.2	37	-16.2%
	Other	6	0.9%	3.6	12	-50%
	Unknown	136	21%	N/A	176	-22.7%
	White	474	73.3%	9.3	543	-12.7%
Age Group	00 to <01	26	4%	34.5	30	-13.3%
	01 to 04	66	10.2%	21.7	112	-41.1%
	05 to 14	52	8%	6.6	89	-41.6%
	15 to 24	74	11.4%	8.9	95	-22.1%
	25 to 39	114	17.6%	10	146	-21.9%
	40 to 64	222	34.3%	11.1	241	-7.9%
	65 and older	92	14.2%	10.4	95	-3.2%
	Unknown	1	0.2%	N/A	3	-66.7%
District	Central	78	12.1%	11.6	77	1.3%
	Eastern	241	37.2%	10.8	242	-0.4%
	Northwest	93	14.4%	5.9	219	-57.5%
	Southeast	118	18.2%	24.9	98	20.4%
	Southwest	117	18.1%	11.1	192	-39.1%
	State of Missouri	647	100%	10.7	815	-20.6%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Challenges that have been acknowledged nationally include: decreasing the contamination of poultry meat; reducing the development of resistant strains; preventing consumption of raw milk; better detection of outbreaks; determining the proportion of cases related to poultry and infections due to consumption of well water; consumer education; identifying sources and syndromes associated with *Campylobacter*; understanding the impact of culture-independent diagnostic tests on surveillance for human *Campylobacter* infection.

Comparison to National Data: In 2013, the statewide IR was 10.7 cases per 100,000 population. Campylobacteriosis was not a nationally notifiable disease in 2013. However, the Council of State and Territorial Epidemiologists (CSTE) position statement entitled *Standardized Surveillance for Campylobacteriosis and Addition to the Nationally Notifiable Condition List* passed in June 2014, thus the Nationally Notifiable Disease Surveillance System will begin tracking *Campylobacter* as a notifiable condition in January 2015.

It is important that cases continue to be promptly reported and potential sources investigated. The collection of accurate exposure information from the ill persons or their surrogates remains an integral component of public health surveillance. Young children, the elderly, and the immunocompromised are the most likely to have severe infections or complicated disease. There is no vaccine to prevent campylobacteriosis.

Prevention: Cook poultry thoroughly. Do not eat or drink foods containing raw (unpasteurized) milk. For additional information on foodborne illness visit the MDHSS website.

Some simple food handling practices that can help prevent campylobacteriosis:

- Cook all poultry products thoroughly. Make sure that the meat is cooked throughout (no longer pink) and any juices run clear. All poultry should be cooked to reach a minimum internal temperature of 165° F.

Section A - Communicable Disease Surveillance

Campylobacteriosis - continued

- If you are served undercooked poultry in a restaurant, send it back for further cooking.
- Wash hands with soap and warm water before preparing food, after handling raw foods of animal origin, and before touching anything else.
- Prevent cross-contamination in the kitchen by using separate cutting boards for foods of animal origin and other foods and by thoroughly cleaning all cutting boards, countertops, and utensils with soap and hot water after preparing raw food of animal origin.
- Do not drink unpasteurized milk or untreated surface water.
- Make sure that persons with diarrhea, especially children, wash their hands carefully and frequently with soap and warm water to reduce the risk of spreading the infection.

For additional information visit: http://www.cdc.gov/foodsafety/diseases/campylobacter/technical.html.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

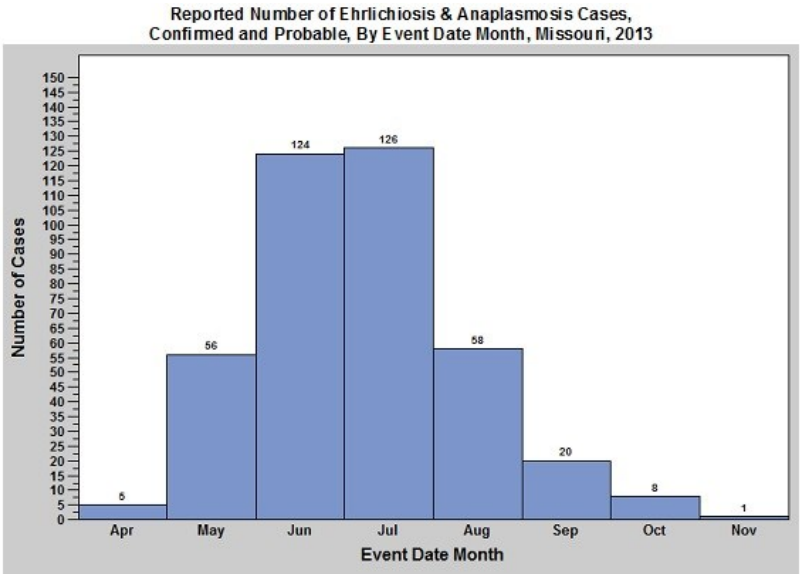
Ehrlichiosis and Anaplasmosis

2013 Case Total 398 **2013 Incidence Rate 6.6 per 100,000**
2012 Case Total 228 **2012 Incidence Rate 3.7 per 100,000**

Human ehrlichiosis and anaplasmosis are tick-borne diseases caused by several closely related bacteria. The bacteria are maintained in nature in parasite-host cycles involving ticks and mammals. Human infections are usually the result of a bite from an infected tick. The bacterial agents that cause ehrlichiosis, *Ehrlichia chaffeensis* and *Ehrlichia ewingii,* are carried by the Lone Star tick, with the majority of disease reports coming from the southeastern and south central U.S. Anaplasmosis is caused by *Anaplasma phagocytophilum*, which is carried by the deer or blacklegged tick, the same tick responsible for Lyme disease transmission. In a geographic pattern similar to Lyme disease, human anaplasmosis is identified most frequently in eastern and north central states and in Pacific coast states.

Following transmission into the human host, *Ehrlichia* and *Anaplasma* bacteria infect white blood cells, spreading through the bloodstream to various tissues, possibly including the liver, spleen, kidney, heart, lymph nodes, and bone marrow. The onset of symptoms usually begins one to two weeks after the bite of an infected tick. High fever and severe headache are the most commonly reported symptoms, sometimes with shaking chills, muscle pain, nausea, vomiting, diarrhea, confusion, red eyes, rash, and tiredness. Characteristic clinical laboratory findings include a low platelet count, a decrease in the number of white blood cells, and elevated liver enzymes. Ehrlichiosis can lead to life-threatening illness in otherwise healthy adults and children. People over the age of 40 and people undergoing immunosuppressive therapy or with a pre-existing immunosuppressive condition are especially vulnerable to serious infections and hospitalization. Some infected people, however, never develop symptoms, and others experience only mild symptoms that resolve without treatment. The greatest challenge to health care providers is diagnosing ehrlichiosis early in the course of illness, when antibiotic therapy is most effective. Doxycycline is the first line treatment for adults and children of all ages, and should be initiated immediately when ehrlichiosis is suspected.

Missouri Incidence: In 2013, Missouri identified 398 cases of ehrlichiosis (all), reflecting a 105.2% increase from the five-year median of 194 cases. There were three deaths¥ and more than half of the reported cases (n=213) required hospitalization¥. Although cases of ehrlichiosis can occur during any month of the year, the majority of cases are reported during the summer months. A peak in cases typically occurs in the months of June and July, indicating a seasonal trend. This period is the season for increased numbers of adult and nymphal Lone Star ticks, which are the primary life stages of ticks that bite humans, and if infected, can transmit disease.



Section A - Communicable Disease Surveillance

Ehrlichiosis & Anaplasmosis - continued

The incidence of ehrlichiosis in Missouri men was about twice that of women, with 8.5 cases per 100,000 men compared with 4.8 cases per 100,000 women. An overrepresentation of males diagnosed with ehrlichiosis has been observed at the national level as well, and may be due to men having greater exposure to ticks through occupational and recreational activities. A consistent trend in state and national ehrlichiosis surveillance is the disproportionate toll in incidence the disease inflicts on people age 40 and older. This segment of the population tends to be more susceptible to severe infection, complications, and hospitalization. Of the 398 cases identified in Missouri in 2013, individuals aged 40 and older accounted for over 79% of the state's reports. Epidemiologists project that this age-differential effect in ehrlichiosis incidence will continue, if not increase, in the next two decades, due to the advancing age of baby-boomers as well as people receiving immunosuppressive therapies or suffering from auto-immune or infectious conditions that weaken the immune system. A small segment of Missouri's ehrlichiosis cases (22 cases, or approximately 6%) were identified in children under the age of 15. In 2013, persons with ehrlichiosis ranged in age from two to 95 years, with a median age of 57 years.

Ehrlichiosis & Anaplasmosis (All)
Comparative Statistics by Socio-demographic Category, Missouri 2013[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	147	36.9%	4.8	83	77.1%
	Male	251	63.1%	8.5	111	126.1%
Race	Black	1	0.3%	0.1	3	-66.7%
	Unknown	51	12.8%	N/A	14	264.3%
	White	346	86.9%	6.8	179	93.3%
Age Group	00 to <01	0	0%	0	0	0%
	01 to 04	9	2.3%	3	2	350%
	05 to 14	13	3.3%	1.7	9	44.4%
	15 to 24	20	5%	2.4	10	100%
	25 to 39	39	9.8%	3.4	22	77.3%
	40 to 64	186	46.7%	9.3	85	118.8%
	65 and older	131	32.9%	14.8	66	98.5%
District	Central	76	19.1%	11.3	38	100%
	Eastern	73	18.3%	3.3	51	43.1%
	Northwest	64	16.1%	4.1	27	137%
	Southeast	51	12.8%	10.7	23	121.7%
	Southwest	134	33.7%	12.7	51	162.7%
	State of Missouri	398	100%	6.6	194	105.2%

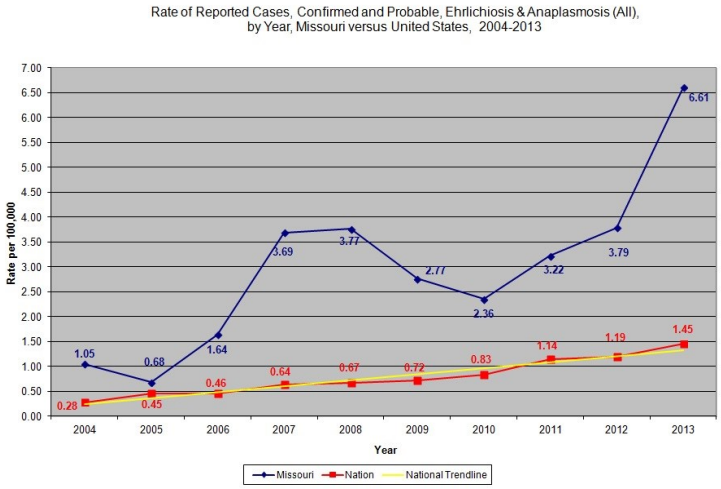
[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).
In 2008 Anaplasmosis was recognized as a separate condition.

The highest percentage of cases were reported in the Southwest district, totaling 33.7% (n=134) of all Missouri cases, and this district also had the highest reported incidence rate (IR) at 12.7 cases per 100,000 population. Central and Southeast districts also reported a significant IR. The IR for Central district was 11.3 cases per 100,000 population (n=76) and 10.7 cases per 100,000 population (n=51) in the Southeast district. Northwest district reported 4.1 cases per 100,000 population (n=64) and Eastern district reported the lowest IR in the state with 3.3 cases per 100,000 population (n=73). All districts have experienced an increase in the number of ehrlichiosis reports compared to the five-year median. Unfortunately, there are no independent measures of the geographic distribution of tick density or infection prevalence, so it is not known whether these regional variations in disease incidence are significant. It should be remembered that elevations in incidence and relative rates at the county level can be the result of a single case being identified in one of Missouri's more sparsely populated counties.

Comparison to National Data: During the previous ten year period of 2004-2013, Missouri's ehrlichiosis rates have been consistently higher than the corresponding national rates. The state's yearly IR began increasing markedly over national rates in 2006. In 2013, Missouri's IR was 6.6 cases per 100,000 population compared to the national rate of only 1.2 cases per 100,000 population. The IR for both Missouri and the nation are on an upward trend. As mentioned previously, the number of ehrlichiosis reports among men and adults over the age of 40 tend to be higher, both in Missouri and the nation as a whole.

Section A - Communicable Disease Surveillance

Ehrlichiosis & Anaplasmosis - continued



Nationwide, the states with highest incidence of ehrlichiosis reports include Oklahoma, Missouri, and Arkansas. Together, these states account for more than 30% of the national reports. Reports of ehrlichiosis correspond to parts of the country where the Lone Star tick is commonly found. Some reports, particularly in areas where the Lone Star tick is uncommon, may be a result of various situations: an individual may have recently traveled to an area where ehrlichiosis is known to be endemic, misdiagnosis of illness caused by similar disease presentation for other tick-borne diseases, or the presence of the Lone Star tick may be poorly or completely undocumented in some areas.

Challenges: Increases in reports of ehrlichiosis over the past several decades are a result of changes in a complex of environmental, biological, demographic, and exposure factors. Field research has demonstrated that a key factor is the increase in Lone Star tick population density coupled with the increase in reservoir host (i.e., white-tailed deer) populations for *E. chaffeensis*. In addition, ehrlichiosis has increasingly been identified in an expanding population segment that is immune-suppressed through aging, infectious diseases, malignancy, or medical therapy. Increased human contact with natural foci of infection through recreational and occupational activities is also a contributing factor, as well as health care providers' increasing awareness of the disease. Electronic reporting of laboratory results to health departments permits more efficient disease reporting.

Prevention: Tick control through the use of pesticides, unlike mosquito control, is not feasible at the community level. Most pesticides effective against ticks also kill beneficial insects, making control efforts in residential yards problematic for many consumers. Prevention of ehrlichiosis and other tick-borne disease is generally focused on preventing tick bites. Showering after tick exposure followed by a change of clothes increases the likelihood that an attached tick is found and removed promptly. The tick bite site should be washed with soap and water and checked periodically for signs of secondary infection. People who experience an allergic reaction to tick bites can apply a topical antihistamine or hydrocortisone. While it is important for Missourians to be aware of and protect themselves from this tick-borne illness, there is no reason to stop enjoying the great outdoors! Following a few simple tips can significantly reduce your risk of contracting illness.

1. If your work or recreation takes you to areas with lots of ticks:
   - Wear light-colored long pants, long sleeves, and socks.
   - Apply insect repellents with 20% - 50% DEET on skin and clothing.
   - Apply permethrin to clothing and gear to repel ticks. Do NOT apply permethrin to skin!
2. Children two months and older, use a repellent with 30% DEET or less.

Section A - Communicable Disease Surveillance

Ehrlichiosis & Anaplasmosis - continued

3. Check frequently for ticks. If you find an attached tick on the body:
   - Use fine-tipped tweezers to grab an attached tick close to skin and pull straight up with a steady motion until removed.
   - Do not squeeze or crush the body of the tick because this may force infective body fluids through into mouth parts and into wound site.
   - Do not apply solutions such as petroleum jelly, finger nail polish, finger nail polish remover, repellents, pesticides, or a lighted match to the tick while it is attached. This may cause the tick to free more infective fluid into the wound site.
4. Contact a health care provider if sudden, severe symptoms develop within 7-14 days following a tick bite or exposure to tick habitat.

Additional Website Resources:

CDC Health Topics
Anaplasmosis
Ehrlichiosis

CDIRM
Anaplasmosis
Ehrlichiosis

Section A - Communicable Disease Surveillance

Influenza

2013 Case Total 23,046 **2013 Incidence Rate 382.7 per 100,000**
2012 Case Total 37,037 **2012 Incidence Rate 616.2 per 100,000**

Influenza is a contagious viral respiratory illness caused by three types of influenza viruses, types A, B and C. Influenza A viruses are further characterized into subtypes based on their surface proteins. Influenza virus types A and B are responsible for seasonal influenza epidemics each year, with influenza A viruses being the most severe. Over the course of a influenza season, it is common for various influenza A subtypes and influenza type B to circulate. Influenza and pneumonia combined are among the top 10 leading causes of death in the U.S. An average of 36,000 deaths and more than 200,000 hospitalizations are associated with influenza annually. In Missouri, an average of 2,800 influenza and pneumonia associated deaths occurred annually during the five previous influenza seasons.

Influenza infections can vary from asymptomatic (no symptoms) to severe and potentially fatal disease. Illness is characterized by abrupt onset of fever, chills, headache, malaise, diffuse myalgia, and nonproductive cough. Sore throat, nasal congestion, rhinitis, and cough become more prominent as symptoms progress. Most people with influenza illness recover within a week, but a cough and fatigue can linger longer. Dehydration, bronchitis, and bacterial pneumonia, are examples of complications from influenza. Influenza can also exacerbate chronic health problems such as asthma, chronic lung disease, chronic congestive heart failure, and other existing conditions. Persons 65 years and older, children under the age of two, and persons of any age with chronic medical conditions are at highest risk for serious complications of influenza.

The influenza season for national reporting purposes is defined as the period usually between the first week of October (week 40) of one year and mid-May of the next (week 20). Influenza seasons are unpredictable particularly as to when they begin, the severity, which viruses will circulate, and the effectiveness of the influenza vaccine. The U.S. Food and Drug Administration's Vaccines and Related Biological Products Advisory Committee considers the World Health Organizations recommendations and makes a final decisions regarding the composition of seasonal influenza vaccine for the U.S. The recommendations for the upcoming influenza season are generally released in February.

Reported Influenza Cases by Type, For the 2013-2014 Flu Season, As Compared to the 5-Season Median 2008-2013, Missouri

Influenza Type	2013-14 Season	Percent of Total	5-Season Median	Percent Change from 5-Season Median
Influenza A	20,655	89.6%	14,643	41.1%
Influenza B	1,280	5.6%	3,844	-66.7%
Influenza Unknown or Untyped	1,111	4.8%	1,347	-17.5%
Total	23,046	100%	20,485	12.5%

Missouri Incidence: The 2013-2014 influenza season began September 29, 2013, and ended May 17, 2014. A total of 23,046 influenza cases were reported in Missouri resulting in an incidence rate (IR) of 382.7 cases per 100,000 population. The number of reported cases by virus type included influenza A 20,655 (89.6%), influenza B 1,280 (5.6%), and 1,111 (4.8%) of cases with an influenza virus type that was unknown or not reported. In 2013, reported influenza cases increased by 12.5% when compared to the five-year median data from 2008-2013.

The 2013-2014 influenza season began to increase in November before peaking in early January.

Section A - Communicable Disease Surveillance

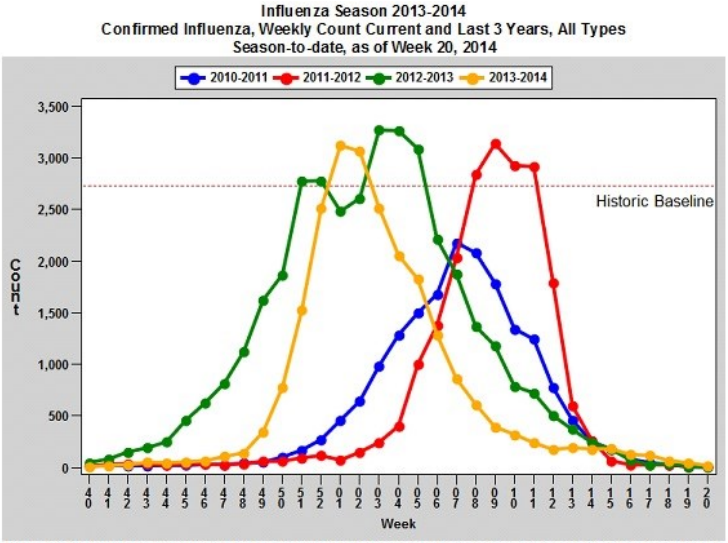
Influenza - continued

Approximately 37.1% of all reported influenza cases were less than 15 years of age. Persons 50 years of age or older accounted for 20.4% of all influenza cases reported in Missouri. The age group of 15-24 and 25-49, accounted for 42.5% of cases.

The highest proportion of cases, 37.0% (n=8,519) was observed in Northwest district. The Northwest district's IR was 539.6 cases per 100,000 population, Southeast 453.4 cases per 100,000 population, Southwest 384.0 cases per 100,000 population, Central 359.1 cases per 100,000 population, and Eastern 263.6 cases per 100,000 population.

Only clinical isolates or specimens from influenza-associated pediatric mortality (i.e., deaths in children younger than 18 who test positive for influenza) identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory for confirmation and identification. No pediatric influenza-associated deaths were reported in Missouri during the 2013 -2014 influenza season. In addition, a random sample of influenza specimens are also selected and submitted to CDC for further testing. A total of 46 specimens from Missouri were submitted to CDC for antigenic characterization during the 2013-2014 season. The characterization of the specimens submitted are as follows: (4) A/ TEXAS/50/2012-LIKE (H3N2) GP, (2) B/ MASSACHUSETTS/02/2012-LIKE, (28) A/ CALIFORNIA/07/2009-LIKE (H1N1)pdm09, (1) A/CALIFORNIA/07/2009-LIKE, (1) A/ CALIFORNIA/07/2009-LIKE (H1N1)pdm09 LOW, and (10) Influenza virus not recovered.

Two influenza associated outbreaks were reported in Missouri during the 2013-2014 season, which was less than the seven influenza outbreaks reported during the previous season. No influenza associated school closures were reported during the 2013-2014 influenza season as compared to the 14 school closure reported during the previous season.



Historic Baseline is calculated as the mean weekly count of the reported confirmed flu cases plus 2 standard deviation from the 2010-2011 ,2011-2012 and 2012-2013 flu seasons.

Reported Influenza Cases by Select Age Groups for the 2013-2014 Flu Season, Compared to 5-Season Median 2008-2013, Missouri

Age Group	Count	Percent of Total	5-Season Median	Percent Change from 5-Season Median
00-<02	2,191	9.5%	1,865	17.5%
02-04	2,279	9.9%	3,476	-34.4%
05-14	4,088	17.7%	6,997	-41.6%
15-24	2,663	11.6%	2,669	-0.2%
25-49	7,126	30.9%	3,521	102.4%
50-64	3,220	14%	1,297	148.3%
65 and older	1,479	6.4%	828	78.6%
Total	23,046	100%	20,485	12.5%

Reported Influenza Cases by Health District for the 2013-2014 Flu Season, as Compared to the 5-Season Median 2008-2013, Missouri

District	Count	Percent of Total	Rate per 100,000	5-Season Median	Percent Change from 5-Season Median
Central	2,407	10.4%	359.1	3,340	-27.9%
Eastern	5,909	25.6%	263.6	6,052	-2.4%
Northwest	8,519	37%	539.6	6,461	31.9%
Southeast	2,153	9.3%	453.4	2,763	-22.1%
Southwest	4,058	17.6%	384	3,767	7.7%
Total	23,046	100%	382.7	20,485	12.5%

Section A - Communicable Disease Surveillance

Influenza - continued

Determining the specific causes for the 12.5% increase in reported influenza cases observed in Missouri during the 2013-2014 season is difficult. Possible causes may have included the type and subtype of the influenza viruses that circulated, improved availability of rapid influenza tests, improved reporting, or to other unknown factors.

Challenges: There are many public health challenges associated with influenza. Most healthy adults are infectious one day before symptoms develop and up to five to seven days after becoming ill. Persons can also be infected with the influenza virus and have no symptoms. In both instances, an apparently healthy person could spread influenza virus to others. Influenza viruses change and therefore influenza vaccines must also be evaluated for change annually. Once the vaccine composition is selected, manufacturers operate under a very tight timeline for producing, testing, releasing and distributing the vaccine. Problems encountered during production may cause shortages or delays. The unpredictability of vaccine production, distribution, and availability does not always coincide with peak demand for the vaccine. An additional public health challenge associated with influenza is the potential emergence of new variants of the virus. Animals, especially birds, carry influenza viruses, which can mutate into new variants of the virus, which can become capable of infecting humans. New influenza variants are of great concern as they have the potential of causing a pandemic and could circulate prior to the availability of new influenza vaccines. Therefore, the ongoing surveillance activities for influenza are critically important. Health care providers should also consider influenza a possible cause of respiratory illness outside of the typical influenza season.

Comparison to National Data: Individual cases of influenza are not nationally reportable; therefore direct comparison of national and Missouri specific influenza data is difficult. However, data from the weekly percentage of outpatient visits for Influenza-Like Illness (ILI), as reported by the U.S. Outpatient ILI Surveillance Network (ILINet), is comparable. Nationally, the weekly percentage of outpatient visits for ILI met or exceeded the national baseline level of 2.0% for 15 weeks during the 2013-2014 influenza season. The peak percentage of outpatient visits for ILI was 4.6%, and occurred in the week ending December 28, 2013 (week 52). The weekly percentage of outpatient visits for ILI in Missouri, exceeded the Missouri specific baseline of 2.42% for 11 weeks during the week ending December 7, 2013 (week 49), through February 15, 2014 (week 7). The percentage of visits for ILI peaked at 7.18% during the week ending December 28, 2013 (week 52).

During the 2013-2014 season, influenza A (H3N2), 2009 influenza A (H1N1), and influenza B were reported in the U.S. Nationally, the 2009 H1N1 viruses predominated overall during the flu season, though influenza B viruses became the predominant virus nationally later in the 2013-2014 season. However in Missouri the 2009 H1N1 remained predominant throughout the entire influenza season. This season was the first since the 2009 H1N1 pandemic in which H1N1 viruses predominated the influenza season. Nationally, a total of 105 influenza-associated pediatric deaths were reported during the 2013-2014 influenza season. No influenza-associated pediatric deaths were reported in Missouri. As reported by CDC, nearly all of the influenza virus specimens sent to CDC for further antigenic characterization were similar to the components of the 2013-2014 influenza vaccine.

Section A - Communicable Disease Surveillance

Influenza - continued

Prevention: The single best way to prevent seasonal influenza is to get vaccinated each year. Everyone older than six months of age (with rare exception) is recommended to get the influenza vaccination. Talk to your doctor or nurse if you have any questions regarding whether influenza vaccine is appropriate for you; and which influenza vaccine option is best for you and your family. To prevent influenza it is particularly important for persons who are at increased risk for severe complications from influenza, or who are at high risk for influenza-related outpatient, emergency department, or hospital visits to receive the influenza vaccine annually.

Influenza antiviral drugs are also available that can be used to treat and prevent influenza. Timely empiric antiviral treatment is recommended for patients with severe, complicated, or progressive influenza illness; those at higher risk for influenza complications; or those for whom treatment can be started within 48 hours of illness onset. Additional influenza prevention activities include incorporating the following good health habits:

1. **Avoid close contact.** Avoid close contact with people who are sick. When you are sick, keep your distance from others to protect them from getting sick too.
2. **Stay home when you are sick.** If possible, stay home from work, school, and errands when you are sick. You will help prevent others from catching your illness.
3. **Cover your mouth and nose.** Cover your mouth and nose with a tissue when coughing or sneezing. It may prevent those around you from getting sick.
4. **Clean your hands.** Washing your hands often will help protect you from germs. If soap and water are not available, use an alcohol-based hand sanitizer.
5. **Avoid touching your eyes, nose or mouth.** Germs are often spread when a person touches something that is contaminated with germs and then touches his or her eyes, nose, or mouth.
6. **Practice other good health habits.** Clean and disinfect frequently touched surfaces at home, work or school, especially when someone is ill. Get plenty of sleep, be physically active, manage your stress, drink plenty of fluids, and eat nutritious food.

Additional information pertaining to influenza and influenza surveillance can be found on the Missouri Department of Health and Senior Services' website at http://health.mo.gov/living/healthcondiseases/communicable/influenza/ and by visiting the CDC website at http://www.cdc.gov/flu/about/disease/index.htm.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

Measles

2013 Case Total 3 **2013 Incidence Rate 0.05 per 100,000**
2012 Case Total 0 **2012 Incidence Rate 0 per 100,000**

Measles is a highly contagious virus that is found in the nose and throat mucus of an infected person. It can spread to others through coughing and sneezing. Also, measles virus can remain infectious or viable for up to two hours on a surface or in an airspace where the infected person coughed or sneezed. If other people breathe the contaminated air or touch the infected surface, then touch their eyes, noses, or mouths, they can become infected. Measles is so contagious that if one person has it, 90% of the people close to that person who are not immune will also become infected.

Measles starts with a fever, runny nose, cough, red eyes, and sore throat, and is followed by a rash that spreads all over the body. About three out of 10 people who get measles will develop one or more complications including pneumonia, ear infections, or diarrhea. Some people may suffer from severe complications, such as pneumonia (infection of the lungs) and encephalitis (swelling of the brain). They may need to be hospitalized and could die.

In 2000, measles was declared eliminated in the U.S. This means that the disease is no longer endemic in the U.S. The U.S. was able to eliminate measles because it has a highly effective vaccination program and a strong public health system for detecting and responding to measles cases and outbreaks. However, measles is still common in many countries so this disease will continue to be brought into the U.S. People who get measles put others at risk who cannot get vaccinated because they are too young or they have specific health conditions not allowing them to get vaccinated. Communities with pockets of unvaccinated people are vulnerable to measles outbreaks. For more information on measles visit: http://www.cdc.gov/measles/index.html.

Missouri Incidence: In 2013, measles increased by 200% when compared to the five-year median data from 2008-2012. International travel was associated with 100% of the cases.

Persons with measles ranged in age from one year to 39 years of age, with a median age of two years of age. Sixty-six percent of the cases were among children between one and four years of age. Females accounted for 66.7% of the cases, 66.7% of cases were caucasian and 33.7% were Asian. Cases occurred in the Southwest district 66.7% (n=2), resulting in an incident rate of 0.19 cases per 100,000 population and the Eastern district 33.3%) n=1, with an incident rate of 0.04 cases per 100,000 population. No cases were seen in the other districts.

Measles
Comparative Statistics by Socio-demographic Category, Missouri 2013[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	2	66.7%	0.07	0	N/A
	Male	1	33.3%	0.03	1	0%
Race	Black	0	0%	0	0	0%
	Other	1	33.3%	0.6	0	N/A
	White	2	66.7%	0.04	1	100%
Age Group	00 to <01	0	0.0%	0	0	0%
	01 to 04	2	66.7%	0.66	0	N/A
	05 to 14	0	0%	0	0	0%
	15 to 24	0	0%	0	0	0%
	25 to 39	1	33.3%	0.09	0	N/A
	40 to 64	0	0%	0	0	0%
	65 and older	0	0%	0	0	0%
District	Central	0	0%	0	0	0%
	Eastern	1	33.3%	0.04	0	N/A
	Northwest	0	0%	0	0	0%
	Southeast	0	0%	0	0	0%
	Southwest	2	66.7%	0.19	0	N/A
	State of Missouri	3	100%	0.05	1	200%

[1]Socio-demographic Category Information is missing for some cases. N/A=No
Data Source: Missouri Health Information Surveillance System (WebSurv).

Two cases (66.7%) were hospitalized[¥]. The cases requiring hospitalization were between one and four years of age. No measles-associated deaths[¥] were reported in 2013. There was one multi-state measles outbreak that accounted for two of the three cases that occurred in Missouri. Additional information on this outbreak is available by clicking here.

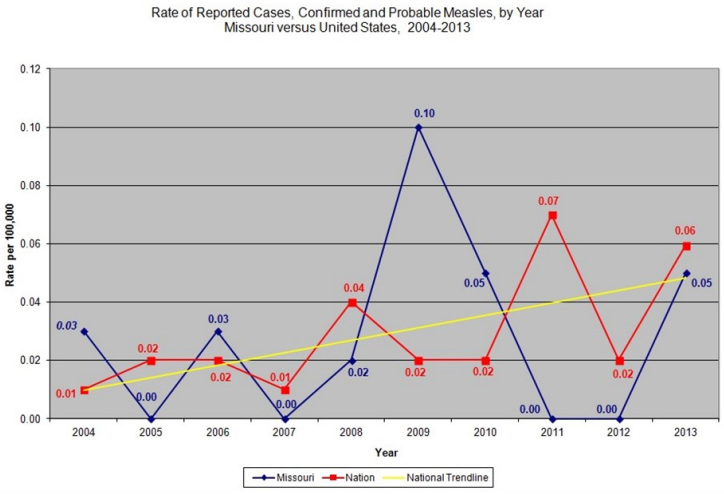
Section A - Communicable Disease Surveillance

Measles - continued

Measles specimens are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for additional testing; 66.7% (n=2) of the specimens were sent to either the MSPHL or CDC for confirmatory testing. The one specimen that was not sent to the MSPHL or CDC was tested at an out-of-State reference lab. That case was epi-linked to another case which was tested through the MSPHL and CDC. All three cases met "confirmed" case definition which means they presented as acute febrile rash illnesses and were verified by positive laboratory results.

The immunization compliance of children 19 months of age through kindergarten entry is monitored in Missouri. In 2013, 96.3% of the 20,287 children reviewed had been adequately immunized with MMR (measles, mumps, and rubella vaccine).

Comparison with National Data: In 2013, Missouri's incident rate was 0.05 cases per 100,000 population which was slightly lower than the national incident rate of 0.06 cases per 100,000 population. Nationally, measles is trending upward. Measles cases mostly involve individuals who are exposed to imported measles cases or were infected during a resulting chain of transmission and who were either unvaccinated or had unknown vaccine status. Lack of adherence to existing recommendations for measles prevention among groups at high risk (e.g., individuals who travel internationally), can spread measles to susceptible populations, including infants too young to be vaccinated and groups who routinely oppose vaccination. Missouri's trend has been more variable over the past five years. The increase observed in 2009 was the result of an outbreak in an unvaccinated population within the State.



Challenges: Measles is one of the most contagious of all infectious diseases and it is still common in many parts of the world. As international travel increases and unvaccinated, inadequately vaccinated or children with unknown vaccine statuses persist, opportunities for Missourians to be exposed to measles will continue. Worldwide, an estimated 20 million people get measles and 122,000 people die from the disease each year—that equals about 330 deaths every day or about 14 deaths every hour.

Routine vaccination in the U.S. begins at 12-15 months of age. This leaves infants highly vulnerable to the virus. According to the CDC, for every 1,000 children who get measles, one or two will die from it. Children younger than five years of age and adults older than 20 years of age are more likely to suffer from measles-associated complications. Measles may cause pregnant woman to give birth prematurely, or have a low-birth-weight baby. Therefore, immunization of eligible individuals and surveillance for fast identification and isolation of cases is important.

Section A - Communicable Disease Surveillance

Measles - continued

Prevention: Measles can be prevented with the MMR (measles, mumps, and rubella) vaccine. Infants and others who are ineligible for vaccine should be surrounded with family members and care givers who are vaccinated against measles and should avoid travel to endemic countries. Americans traveling abroad should check their vaccine records before traveling to be sure they have been appropriately immunized. Other preventive measures to reduce the risk of measles include education for unimmunized populations within Missouri and prompt detection of cases to implement control measures. For additional prevention information visit: http://www.cdc.gov/measles/vaccination.html.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

Pertussis

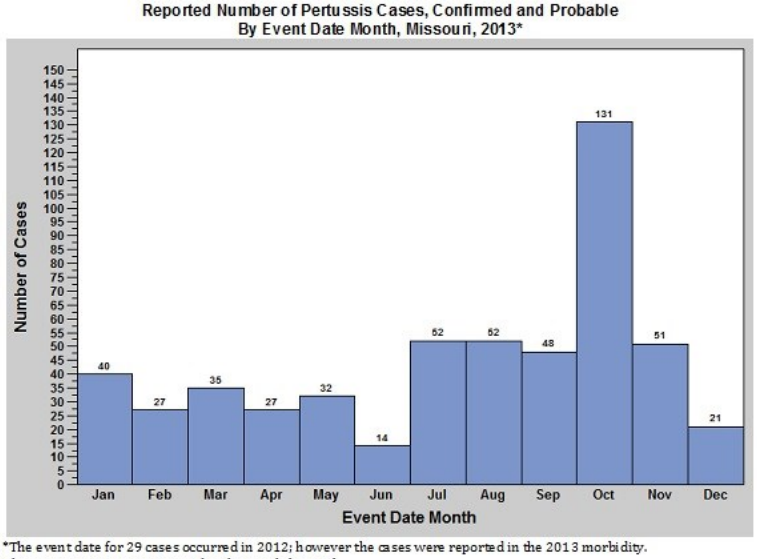
2013 Case Total 559 **2013 Incidence Rate 9.3 per 100,000**
2012 Case Total 815 **2012 Incidence Rate 13.6 per 100,000**

Pertussis is a highly communicable, vaccine-preventable disease that affects the respiratory tract. The illness is caused by *Bordetella pertussis* (*B. pertussis*) bacteria, for which humans are the only known natural reservoir. In classic cases, pertussis begins with a runny nose, mild cough, and low-grade fever (the catarrhal stage), which progresses to paroxysmal spasms of severe coughing, inspirational "whooping", and post-tussive vomiting. The duration of cough for classic pertussis is six to 10 weeks. Approximately half of adolescents with pertussis cough for 10 weeks or longer. Pertussis may also present as a mild to moderate cough illness in people who are partially immune, which makes diagnosis more elusive to clinicians and can result in unrecognized cases. Pertussis is primarily a toxin-mediated disease. The bacteria attach to the cilia of the respiratory epithelial cells, produce toxins that paralyze the cilia, and cause inflammation of the respiratory tract, which interferes with the clearing of pulmonary secretions.

Bordetella parapertussis which causes less severe pertussis-like illness accounts for 5% of isolates of *Bordetella* spp. in the U.S. *Bordetella holmesii* (*B. holmesii*) is being increasingly recognized as a cause of pertussis-like illness worldwide. In 2010-2011, *B. holmesii* caused large community outbreak of pertussis-like illness in Ohio. This report only addresses *B. pertussis.*

In the U.S., most hospitalizations and nearly all deaths from pertussis occur in infants under six months of age. Complications are most common in infants and young children, and include pneumonia, hypoxia, apnea, seizures, encephalopathy, and malnutrition. Sudden infant death syndrome (SIDS) can be the manifestation of pertussis in young infants. In adults and adolescents protracted coughing episodes may also cause sleep disturbance, urinary incontinence, subconjunctival hemorrhaging, rib fractures, or other sequelae. Pertussis is transmitted through direct contact with discharges from respiratory mucous membranes of infected persons or via aerosolized droplets from coughing and sneezing. The incubation period ranges from 5-21 days, and is usually 7-10 days.

Around 80% of susceptible household contacts of pertussis patients develop the disease. Transmission also occurs in child care settings, schools, clinics, and institutions including hospitals. Pertussis vaccination reduces transmissibility. Children who are too young to be fully vaccinated or who have not completed the primary vaccination series are at highest risk for severe illness. For more information on pertussis visit: http://www.cdc.gov/pertussis/.



*The event date for 29 cases occurred in 2012; however the cases were reported in the 2013 morbidity. These cases are not represented in the graph (n=530).

Missouri Incidence: In 2013, pertussis decreased by 7.5% when compared to the five-year median data from 2008-2012. In addition, a late-summer through autumn trend for pertussis was observed this year in Missouri, with over half (63%) of the cases, occurring

Section A - Communicable Disease Surveillance

Pertussis - continued

July through November (n=334). Three pertussis outbreaks had cases in October, thus the peak in October depicted in the graph on the previous page.

Persons with pertussis ranged in age from three weeks to 85 years, with a median age of 11 years. Sixty-eight percent of the reported cases were among children age 14 years or less. The highest age specific incidence rates (IR) of 108.8 cases per 100,000 population occurred among children less than one year of age followed by 27.9 cases per 100,000 population for children 5-14 years of age. Females accounted for 50.3% of the cases and the race specific IR was higher for Other races with a 9.1 cases per 100,000 population (n=15). The highest proportion of cases occurred in the Eastern district (49.7%, n=278) resulting in the highest district IR of 12.4 cases per 100,000 population. The district specific IR and case counts for the remaining districts was Southeast 8.8 cases per 100,000 population (n=42), Northwest 8.2 cases per 100,000 population (n=129), Southwest 6.4 cases per 100,000 population (n=68) and Central 6.3 cases per 100,000 population (n=42).

Pertussis
Comparative Statistics by Socio-demographic Category, Missouri 2013[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	281	50.3%	9.2	331	-15.1%
	Male	278	49.7%	9.4	273	1.8%
Race	Black	59	10.6%	7.9	34	73.5%
	Other	15	2.7%	9.1	8	87.5%
	Unknown	69	12.3%	N/A	91	-24.2%
	White	416	74.4%	8.1	487	-14.6%
Age Group	00 to <01	82	14.7%	108.8	93	-11.8%
	01 to 04	77	13.8%	25.3	88	-12.5%
	05 to 14	219	39.2%	27.9	333	-34.2%
	15 to 24	73	13.1%	8.8	33	121.2%
	25 to 39	37	6.6%	3.2	56	-33.9%
	40 to 64	54	9.7%	2.7	56	-3.6%
	65 and older	16	2.9%	1.8	10	60%
	Unknown	1	0.2%	N/A	1	0%
District	Central	42	7.5%	6.3	43	-2.3%
	Eastern	278	49.7%	12.4	410	-32.2%
	Northwest	129	23.1%	8.2	59	118.6%
	Southeast	42	7.5%	8.8	36	16.7%
	Southwest	68	12.2%	6.4	42	61.9%
	State of Missouri	559	100%	9.3	604	-7.5%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Thirty-five (6.3%) of the pertussis cases were hospitalized[¥]. Sixty-nine percent of the cases who required hospitalization were less than one year of age. No pertussis-associated deaths[¥] were reported in 2013.

Clinical isolates of *B. pertussis* identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for confirmation by polymerase chain reaction (PCR) and culture. The MSPHL received isolates for 55.6% (n=219) of the reported confirmed and probable cases. *NOTE*: A total of 121 cases (93 confirmed and 28 probable) were classified as cases in the absence of laboratory testing. An additional 44 cases had serologic tests performed for pertussis. The denominator did not include the 165 cases mentioned above in the calculation (n=394); percentage=219/394.

The immunization compliance of children 19 months of age through kindergarten entry is monitored in Missouri. In 2013, 93.2% of the 20,287 children reviewed had been adequately immunized with DTaP [diphtheria, tetanus, and pertussis vaccine]. There were three school-associated outbreaks and one athletic camp outbreak reported in 2013. The outbreaks were in Eastern (3) and Central districts (1). The outbreaks accounted for 13.4% (n=75) of the pertussis cases.

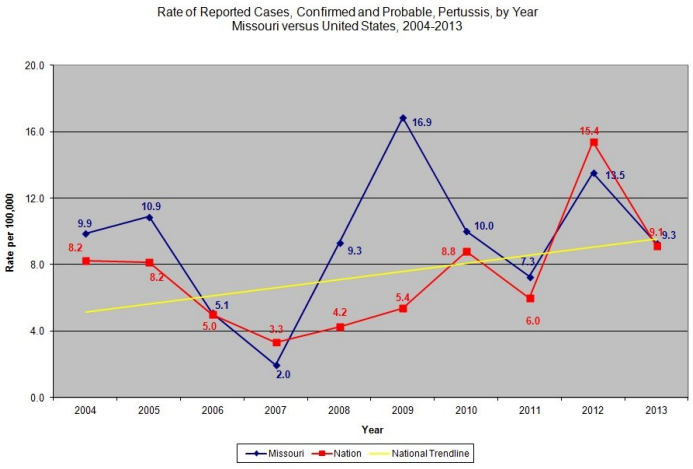
Challenges: There are many challenges associated with pertussis. Pertussis is communicable as it spreads easily from person-to-person through coughing and sneezing. A person with pertussis can infect up to 12 to 15 other people. That's why being up-to-date with pertussis vaccines and practicing good cough etiquette are so important. In addition, many infants who get pertussis are infected by older siblings, parents or caregivers who might not know they have the disease. Pertussis was never eliminated from the U.S. like measles or polio, so there's always the chance for it to be introduced into a community. Multiple types or strains of pertussis bacteria can be found causing disease at any given time. If pertussis is circulating in the community, even a fully vaccinated person of any age could become infected and develop disease.

Section A - Communicable Disease Surveillance

Pertussis - continued.

However the diseases is typically less severe in persons who were previously vaccinated. Developing effective education methods and materials to prevent pertussis is an ongoing public health challenge.

Comparison with National Data: In 2013, the statewide IR was 9.3 cases per 100,000 population as compared to the national IR of 9.1 cases per 100,000 population. The pertussis IR for Missouri has ranged from 2.0 to 16.9 cases per 100,000 population as compared to 3.3 to 15.4 cases per 100,000 population for the 10 year period (2004 to 2013).



Since the early 1980s, nationally there has been an overall trend of an increase in reported pertussis cases. A similar trend has been observed in Missouri. For the 10 year period (2004-2013), the annual IR for pertussis in Missouri has consistently exceeded the national IR, with the exception of 2007 and 2012. The reason for the increase may be due to a combination of factors; increased awareness, greater access to and improved diagnostic tests, better reporting, more circulation of the bacteria, waning immunity, the challenge of controlling a highly contagious and often under-recognized disease in non-infants, the fact that the vaccine efficacy ranges from 80-90%, or to other unknown factors. When it comes to waning immunity, it seems that the acellular pertussis vaccine (DTaP) we use now may not protect for as long as the whole cell vaccine (DTP) used previously.

Nationally, approximately half of infants younger than one year of age who get pertussis are hospitalized. The younger the infant, the more likely treatment will include hospitalization. Of those infants who are hospitalized with pertussis approximately 67% will have apnea; 23% get pneumonia; 1.6% will have convulsions; 0.4% will have encephalopathy; and 1.6% will die. It is important we continue the diligent surveillance of pertussis to promptly identify cases and implement appropriate public health control measures (in certain circumstances, people in close contact with pertussis should receive antibiotics to prevent them from getting the disease). In addition, surveillance allows us to determine the epidemiologic characteristics and monitor the impact of vaccination programs for pertussis in Missouri . The collection of accurate exposure information from ill persons or their surrogates remains an integral component of public health surveillance.

Prevention: The best way to prevent pertussis is keeping up-to-date with recommended pertussis vaccines. Vaccination of pregnant women with Tdap is especially important to help protect infants. Infants should also receive the appropriate pertussis containing vaccines on schedule. In addition, it is important to surround infants and other people at high risk for pertussis complications with family members and care givers who are vaccinated against pertussis. Many infants who get pertussis are infected by older siblings, parents or caregivers. Beginning in the 2010-2011 school year, eighth grade students in Missouri are required to receive a booster dose of Tdap. Many other states have implemented similar strategies. Other preventive measures to reduce the risk of pertussis include the education and implementation of good hand washing and appropriate cough/sneeze etiquette. For additional prevention information visit: http://www.cdc.gov/pertussis/about/prevention/index.html.

Additional Website Resources:

CDC Health Topics CDIRM

Section A - Communicable Disease Surveillance

Q fever

2013 Case Total 24 **2013 Incidence Rate 0.4 per 100,000**
2012 Case Total 3 **2012 Incidence Rate 0.05 per 100,000**

Q fever is a zoonotic disease caused by *Coxiella burnetii* (*C. burnetii*), a bacteria that is distributed worldwide and causes sporadic infections and outbreaks in animal species and humans. *C. burnetii* are spore-forming bacteria that can survive for long periods of time in the environment. The primary sources of Q fever are infected cattle, sheep, and goats, which shed the organism in feces, milk, nasal discharge, placental tissue, and amniotic fluid. *C. burnetii* is known to be present in roughly 20-30% of goat herds, and is also endemic in cattle and sheep.

Humans usually become infected by inhaling *C. burnetii* from air that contains airborne barnyard dust contaminated by infected animals. Cases of Q fever have been documented among people living downwind from infected livestock without having direct exposure to infected animals. Less common routes of transmission include: the consumption of raw dairy products, tick bites, human-to-human transmission, or blood transfusion from an infected donor. Q fever outbreaks associated with animal farms have been reported in the U.S. Because of the high infectivity of this organism, *C. burnetii* is designated a Category B bioterrorism agent.

Typically fewer than 200 human Q fever cases are reported annually in the U.S. However, because the signs and symptoms may resemble other diseases, be mild, or even cause no symptoms, cases of human Q fever are likely under-recognized. As many as 50% of persons infected with Q fever will not develop symptoms. However, the disease can cause significant enough illness to require medical attention. An acute infection can progress to the chronic form of the disease in persons who are immune-compromised, pregnant women, and persons with heart valve abnormalities or vascular grafts.

In acute Q fever, the incubation period is typically two to three weeks after exposure to the organism. Symptoms may include: high fever (104°-105° F), chills and/or sweats, severe headache, malaise, myalgia, non-productive cough, chest pain, and sometimes gastrointestinal symptoms such as nausea, vomiting, diarrhea, or abdominal pain. Most acute Q fever cases will recover completely, but some persons experience serious illness and severe complications, including: pneumonia, hepatitis, myocarditis, and central nervous system complications. Pregnant women who are infected may be at risk for pre-term delivery or miscarriage. The estimated case fatality rate is < 2% of hospitalized patients. Early treatment with an appropriate antibiotic may shorten the duration of illness and lessen the risk of complications.

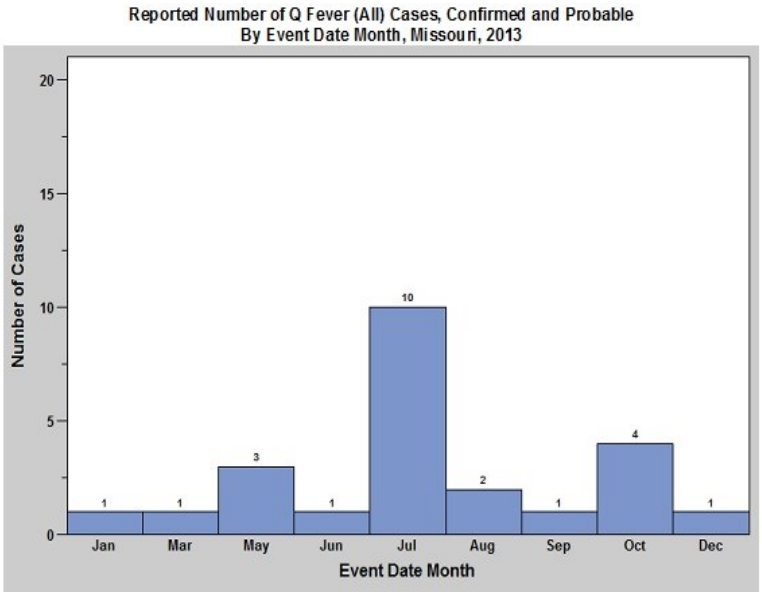
Chronic Q fever occurs in less than 5% of cases, and presents from six weeks to years after an acute infection. Manifestations of the condition include endocarditis (60-70% of cases), aortic aneurysms, and infections of the bone, liver or reproductive organs. The case fatality rate for untreated chronic Q fever ranges from 25-60%. A condition called Post-Q fever fatigue syndrome has been reported in 10-25% of acute patients.

Missouri Incidence: In 2013, Q fever increased by 700% when compared to the five-year median data from 2008-2012. An outbreak of Q fever was identified in Missouri, with the majority (80%) of the cases occurring between June and December of 2013 (n=19; see graph on the following page). Persons with Q fever ranged in age from 11 to 73 years, with a median age of 43 years. The highest age specific incidence rates (IR) per 100,000 population occurred among adults 40-64 years of age, which was 0.6 cases; followed by adults 25-39 years of age, which was 0.5 cases per 100,000 population.

Section A - Communicable Disease Surveillance

Q fever - continued

The highest proportion of cases occurred in the Central district 91.7% (n=22) resulting in the highest district IR which was 3.3 cases per 100,000 population. The IR for the remaining districts are as follows: Northwest 0.1 cases per 100,000 population (n=1), Eastern 0.04 cases per 100,000 population (n=1), and no cases reported in the Southwest and Southeast districts. Missouri statewide frequency was above the five-year median of three cases. Central district was the only state geographic region to observe an increase over the previous five-year median of (2,100 %). Statewide males accounted for 87.5% of the cases, 91.7% identified their race as white, 12.5% (n=3) of the cases were hospitalized and no deaths[¥] were reported.



The outbreak of Q fever, which involved 19 of the reported cases*, was associated with a large dairy farm located in a rural part of Missouri with a low population density.

Challenges: *C. burnettii*, is ubiquitous worldwide, and rather resistant to heat and drying. Once present in the environment, eradication is impractical, if not impossible. It is well known that persons who work with livestock, particularly those who have direct contact with birthing materials of animals infected with Q fever, are at higher risk of contracting the disease than the general population. The outbreak in 2013 highlighted the importance of educating persons who work in animal husbandry about how to reduce their risk of contracting Q fever, and also how to minimize the likelihood of exposing household members and others to *C. burnettii* spores that they may be carried into the home on work boots and clothing.

Q Fever (All)
Comparative Statistics by Socio-demographic Category, Missouri 2013[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	3	12.5%	0.1	0	N/A
	Male	21	87.5%	0.7	3	600%
Race	Black	0	0%	0	0	0%
	Other	1	4.2%	0.6	0	N/A
	Unknown	1	4.2%	N/A	0	N/A
	White	22	91.7%	0.4	3	633.3%
Age Group	00 to <01	0	0%	0	0	0%
	01 to 04	0	0%	0	0	0%
	05 to 14	1	4.2%	0.1	0	N/A
	15 to 24	3	12.5%	0.4	0	N/A
	25 to 39	6	25%	0.5	0	N/A
	40 to 64	11	45.8%	0.6	2	450%
	65 and older	3	12.5%	0.3	0	N/A
District	Central	22	91.7%	3.3	1	2100%
	Eastern	1	4.2%	0	0	N/A
	Northwest	1	4.2%	0.1	1	0%
	Southeast	0	0%	0	0	0%
	Southwest	0	0%	0	1	-100%
	State of Missouri	24	100%	0.4	3	700%

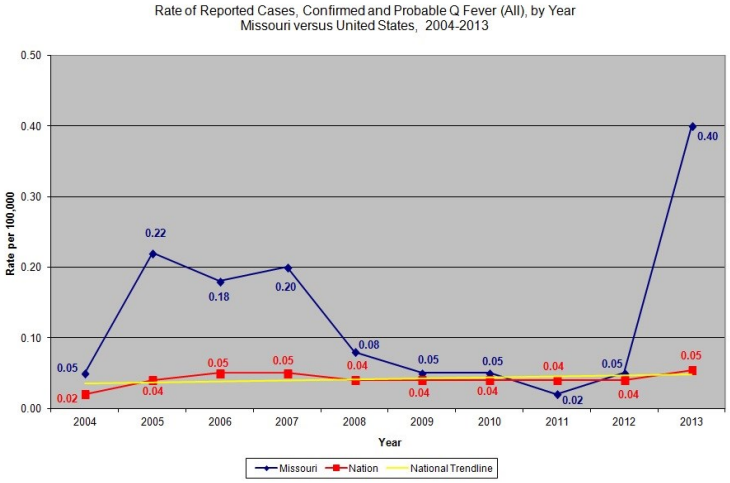
[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Comparison to National Data: In 2013, the statewide IR in Missouri was 0.4 cases per 100,000 population as compared to the national IR of 0.05 per 100,000 population. Missouri's IR in 2013 was also well above the state and national five-year median IRs of 0.05 and 0.04 cases per 100,000 population, respectively. The increase in reported Q fever cases is the result of the outbreak that occurred during the latter half of 2013 in Missouri.

Section A - Communicable Disease Surveillance

Q fever - continued

NOTE: *Several suspect asymptomatic Q fever cases associated with the outbreak were identified during the investigation, but did not meet the national case surveillance case definition for acute or chronic Q fever (and therefore were not included in the 2013 Missouri morbidity).*



Prevention: In the U.S., persons in the following occupations are at highest risk for Q fever: veterinarians, meat processing plant workers, sheep and dairy workers, livestock farmers, and researchers at facilities housing sheep. The CDC recommends that prevention and control efforts should target these groups, and include the following:

- Public education on sources of infection.
- Appropriate disposal of placenta, birth products, fetal membranes, and aborted fetuses at facilities housing sheep and goats.
- Restricting access to barns and laboratories used in housing potentially infected animals.
- Avoid unpasteurized dairy products.
- Use appropriate procedures for handling laboratory clothing.
- Vaccinate (where possible) individuals engaged in research with pregnant sheep or live *C. burnetii*.
- Quarantine imported animals.
- Holding facilities for sheep should be located away from populated areas. Animals should be routinely tested for antibodies to *C. burnetii*, and measures should be implemented to prevent airflow to other occupied areas.
- Identify and counsel persons at highest risk for developing chronic Q fever, especially persons with pre-existing cardiac valvular disease or individuals with vascular grafts.

Vaccines for domestic animals and people working in high-risk occupations have been developed but are not currently licensed in the U.S. For additional information on Q fever visit: http://health.mo.gov/emergencies/ert/pdf/vetmanual.pdf.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

Rabies, Animal and Human

Rabies Post-Exposure Prophylaxis (PEP) Initiated

All Species Map
Wild Species Map
Domesticated Species Map
PEP Map

Rabies is a fatal viral illness that affects only mammals. Although there is great variability in the susceptibility of various species to infection with this virus and subsequent manifestation of disease, any mammal may be infected with the rabies virus and serve as a source of infection for other mammals. Virus is typically present in the saliva of clinically ill mammals and is most often transmitted through a bite. After entering the central nervous system of the next host, the virus causes an acute, invariably progressive encephalomyelitis that is almost always fatal. The incubation period in animals and humans is usually several weeks to months, but may range from days to years. Rabies has the highest case fatality ratio of any infectious disease if prompt intervention is not initiated in the case of humans; there is no post-exposure intervention for animals. Laboratory testing for rabies is useful for confirmation of the virus' presence in certain species and geographic locations, and for determination of the need to administer rabies prophylaxis in cases of human exposure to a potentially rabid animal. The only reliable method of testing animals for the presence of rabies virus is through laboratory analysis of brain tissue. Public health surveillance for this disease in domestic and wild animal populations is a valuable tool in the prevention of human rabies cases.

Rabies (Animal)

During 2013, 39 cases of animal rabies were detected in Missouri, compared to 28 cases the previous year, representing a 39% increase. The 39 positive animals included 20 skunks, 13 bats, three dogs, two cats, and one horse. During the five-year period 2008 through 2012, an annual average of 2,570 specimens were submitted for testing with an average of close to 50 rabid animals detected each year during that period. The annual number of rabies cases during this five-year period ranged from a low of 28 cases in 2012 to a high of 65 cases in 2009. The number of specimens submitted in 2013 did not increase substantially compared to 2012 (less than 1% increase). However, the percentage of specimens that tested positive in 2013 (39 positives/1,855 submissions, giving a rate of 2.1%) was greater than the corresponding percentage in 2012 (28 positives/1,842 submissions, giving a rate of 1.5%). This resulted in the higher number of rabid animals detected in 2013 compared to the previous year. Also noteworthy in 2013 was the unusually high number (six) of rabid domestic animals detected, none of which had been vaccinated against rabies.

Animal Rabies, by Species, Missouri 2013

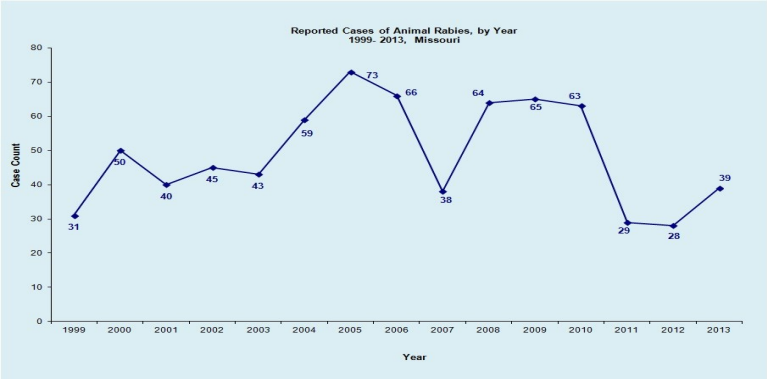
Species	Number Examined	Number Positive	Percent Positive
Bat	589	13	2.2%
Cat	455	2	0.4%
Cow	31	0	0%
Dog	553	3	0.5%
Exotic	2	0	0%
Ferret	2	0	0%
Fox	8	0	0%
Horse	17	1	5.9%
Other Domestic	8	0	0%
Other Wild	23	0	0%
Raccoon	78	0	0%
Rodent/Rabbit	53	0	0%
Skunk	36	20	55.6%
Total	1,855	39	2.1%

The number of rabid animals detected each year varies according to several parameters, including awareness on the part of the public and health community regarding this disease, the willingness and ability of agencies and individuals to submit specimens for testing, competing interests, financial constraints and, of course, the actual incidence of rabies in wildlife. As with most diseases having wild animals as the reservoir, the number of rabies cases goes through a cycle of "troughs" and "peaks" over a period of several years. Peaks usually correspond to the infection of large numbers of immunologically naïve animals that

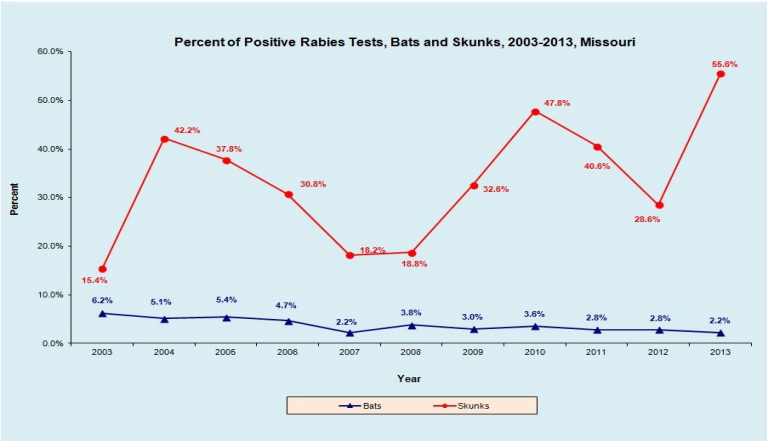
Section A - Communicable Disease Surveillance

Rabies, Animal and Human; Rabies Post-Exposure Prophylaxis (PEP) Initiated - continued

result when populations increase due to favorable environmental conditions, decreased human intervention (hunting, trapping, eradicating), and other factors. Troughs result as transmission rates decrease among rabies die-off survivors, which tend to have a wider degree of geographic dispersion and perhaps some level of immunity. Survivors eventually reproduce, providing a new population of vulnerable animals through which the rabies virus can spread and which results in the next peak of the cycle. As the number of rabid reservoir animals (which are bats and skunks, in Missouri) increases, so does the chance of "spill-over" into other species, both wild and domestic. The skunk variant of the rabies virus is transmitted very effectively from skunk-to-skunk and can also be readily transmitted to other wild and domestic animals. However, when the skunk variant is transmitted to a non-reservoir species (for example, a coyote), the variant is not as easily transmitted from the non-reservoir animal to other animals. In this manner, the non-reservoir species is almost a dead-end host. The same epidemiologic relationship is true for bats (the other reservoir species in Missouri), bat variants of the rabies virus, and non-reservoir species. Finally, the percentage of animals that test positive for rabies presumably increases as the natural incidence increases (and vice versa), but there is little predictive value to this relationship since the exact correlation cannot be determined with existing data.



The Missouri State Public Health Laboratory (SPHL) is the only facility in Missouri that tests animals for rabies. Specimens are tested only when there is known exposure or "significant potential exposure" of any of the following to a possibly infected animal: humans, pets, domesticated animals (e.g., horses, livestock), and exotic or non-native animal species maintained for husbandry purposes or in zoos. A DHSS policy letter with criteria for specimen submission may be found at http://www.health.mo.gov/lab/pdf/rabies_testing_policy.pdf. The policy letter specifically addresses submission of bat specimens, and gives criteria for when they should and should not be submitted for rabies testing. Instructions for submitting specimens and complete animal rabies testing information (including a list of courier pick-up sites) may be found at http://www.health.mo.gov/lab/rabies.php.

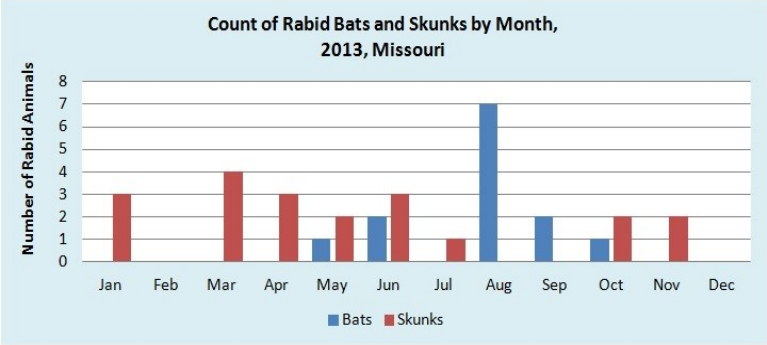


In 2013, specimens were submitted from all regions of the state, with rabid animals detected in 19 counties plus St. Louis City. The first rabid animal detected was a skunk from Douglas County on December 31, 2012, which fell into Week #1 for reporting periods used by the Centers for Disease Control and Prevention

Section A - Communicable Disease Surveillance

Rabies, Animal and Human; Rabies Post-Exposure Prophylaxis (PEP) Initiated - continued

(CDC) in 2013. The last animal detected was a skunk from Phelps County on November 7. Throughout 2013, one or more rabid animals were detected each month from January through November.



Rabies in bats occurs sporadically throughout Missouri. It is estimated that less than 0.5% of bats in the wild are rabid, and only 2.2% of the "high risk" bats (e.g., found sick, dead, or exhibiting unusual behavior) tested positive during 2013. The big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), and the tri-colored bat (*Perimyotis subflavus*) formerly known as the eastern pipistrelle bat account for about 95% of the species of bats found to be rabid in Missouri. While rabid skunks can be found anywhere in the state, most cases are usually confined to roughly the southern one-half of Missouri. Both the north-central and south-central variants of the skunk rabies virus are found in rabid skunks in Missouri. The percent of skunks that test positive for rabies is much more variable than the percent of bats testing positive, with evidence of rabies infection found in 55.6% of the skunks submitted in 2013.

A county is placed under a rabies alert when a positive domestic animal is detected in that county or when the threshold level for rabid wild animals is exceeded. A rabies alert does not place limitations on the movement of animals into, within, or out of the county. Instead, a rabies alert is merely a statement that animal rabies is apparently increasing and thus could pose a human health threat. Five counties were placed under six alerts during 2013: Wayne County (February, rabid horse); Oregon County (March, rabid two-month-old puppy); Howell County (May, rabid cat); Bollinger County (June, rabid dog); Wayne County (June, rabid dog); Texas County (July, rabid cat). Alerts routinely last for 90 days, but can be extended if additional rabid wild/domestic animals are detected during that time.

Rabies (Human)

No human rabies deaths were recorded in Missouri in 2013. The last known human death from rabies in this state occurred in 2008 and involved a man who was bitten by a bat and, although aware of the bite, did not seek medical care or report the incident to public health officials until he was symptomatic. A complete description of this case can be found in the *Morbidity and Mortality Weekly Report*, CDC, Vol. 58/No. 43/November 6, 2009 (http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5843a3.htm).

Rabies Post Exposure Prophylaxis
Comparative Statistics by Socio-demographic Category, Missouri 2013[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	195	51.6%	6.3	162	20.4%
	Male	183	48.4%	6.2	123	48.8%
Race	Black	17	4.5%	2.3	11	54.5%
	Other	3	0.8%	1.8	3	0%
	Unknown	83	22%	N/A	66	25.8%
	White	275	72.8%	5.4	222	23.9%
Age Group	00 to <01	2	0.5%	2.7	4	-50%
	01 to 04	29	7.7%	9.5	19	52.6%
	05 to 14	71	18.8%	9	51	39.2%
	15 to 24	51	13.5%	6.1	48	6.3%
	25 to 39	77	20.4%	6.7	61	26.2%
	40 to 64	116	30.7%	5.8	88	31.8%
	65 & older	31	8.2%	3.5	21	47.6%
	Unknown	1	0.3%	N/A	3	-66.7%
District	Central	66	17.5%	9.8	70	-5.7%
	Eastern	130	34.4%	5.8	127	2.4%
	Northwest	46	12.2%	2.9	18	155.6%
	Southeast	53	14%	11.2	37	43.2%
	Southwest	83	22%	7.9	52	59.6%
	State of Missouri	378	100%	6.3	294	28.6%

[1]Socio-demographic Category Information is missing for some cases. N/A=No
Data Source: Missouri Health Information Surveillance System (WebSurv).

Rabies Postexposure Prophylaxis (Initiated)

"Rabies postexposure prophylaxis (initiated)" (RPEP), became a reportable condition on August 31, 2006.

Section A - Communicable Disease Surveillance

Rabies, Animal and Human; Rabies Post-Exposure Prophylaxis (PEP) Initiated - continued

This condition was reported 378 times during 2013, which was 28.6 percent above the five-year median of 294 reports. Females accounted for 195 (51.6%) of the 378 reports and males accounted for 183 (48.4%) of the reports. The number of reports and percent by age group were as follows: Less than 1 year – 2 (0.50%); 1 to 4 years – 29 (7.7%); 5 to 14 years – 71 (18.8%); 15 to 24 years – 51 (13.5%); 25 to 39 years – 77 (20.4%); 40 to 64 years – 116 (30.7%); 65 and older – 31 (8.2%); age unknown – 1 (0.3%). CDC estimates that about 40,000 persons receive RPEP in the U.S. each year. Missourians no doubt account for a significant portion of these cases due to the endemicity of rabies in wild animals in the state and the interaction of people and their pets with these animals. The expense of providing RPEP remains high and variable, with an estimated cost of almost $5,500 per patient.

Administration of RPEP is a medical urgency, not a medical emergency. Physicians should evaluate each possible exposure to rabies and, if necessary, consult with local or state public health officials regarding the need for rabies prophylaxis. Factors that should be considered before specific antirabies postexposure prophylaxis is initiated include type of exposure (bite, nonbite), epidemiology of rabies in animal species involved, circumstances of bite incident, vaccination status of exposing animal, and availability of animal for quarantine or testing.

If exposed to rabies, previously vaccinated persons should receive two intramuscular doses (1.0 ml each) of vaccine, one immediately and one three days later. Previously vaccinated persons are those who have ever completed one of the recommended preexposure or postexposure regimens of cell tissue culture vaccine, or those who received another vaccine and had a documented rabies antibody titer. Human rabies immunoglobulin (HRIG) is unnecessary and should not be administered to previously vaccinated persons because the administration of passive antibody might inhibit the relative strength or rapidity of an expected anamnestic response.

Persons who have not been previously vaccinated should receive both vaccine and HRIG. The combination of HRIG and vaccine is recommended for both bite and nonbite exposures, regardless of the interval between exposure and initiation of treatment. A regimen of four 1-ml doses of vaccine should be administered intramuscularly. The first dose of the four-dose course should be administered as soon as possible after exposure (day 0). Additional doses should be administered on days 3, 7, and 14 after the first vaccination. Immunosuppressed individuals should receive a fifth dose of vaccine on day 28, with the awareness that the immune response may still be inadequate. A patient who fails to develop an antibody response should be managed in consultation with their physician and appropriate public health officials. As noted above, in addition to bite exposures, HRIG is indicated for non-bite exposures, such as saliva from an infectious animal that is splashed into a person's eyes, nose, or mouth or which comes in contact with a fresh open cut, abrasion, or other wound. HRIG is also indicated in those situations where a bite from an infected animal may not be apparent but is presumed to have occurred (such as a possible bite from a rabid bat) and for which RPEP is being administered. HRIG is administered only once (i.e., at the beginning of RPEP) to previously unvaccinated persons to provide immediate, passive, rabies virus neutralizing antibody coverage until the patient responds to rabies vaccination by actively producing antibodies. If HRIG was not administered when vaccination was begun (i.e., day 0), it can be administered up to and including day seven of the RPEP series. Beyond the seventh day, HRIG is not indicated because an antibody response to rabies vaccine is presumed to have occurred. Because HRIG can partially suppress active production of

Section A - Communicable Disease Surveillance

Rabies, Animal and Human; Rabies Post-Exposure Prophylaxis (PEP) Initiated - continued

antibody, the dose administered should not exceed the recommended dose. The recommended dose of HRIG is 20 IU/kg body weight. This formula is applicable to all age groups, including children. If anatomically feasible, the full dose of HRIG should be thoroughly infiltrated in the area around and into the wounds. Any remaining volume should be injected IM at a site distant from vaccine administration.

This recommendation for HRIG administration is based on reports of rare failures of RPEP when less than the full amount of HRIG was infiltrated at the exposure site. HRIG should never be administered in the same syringe or in the same anatomical site as the first vaccine dose. However, subsequent doses of vaccine in the 4-dose series can be administered in the same anatomic location where the HRIG dose was administered, if this is the preferable site for vaccine administration (i.e., deltoid for adults or anterolateral thigh for infants and small children).

The following measures should be employed to help prevent rabies in the community:

- Ensure dogs, cats, and ferrets are vaccinated against rabies; vaccinations are also available for horses, cattle, and sheep.
- Keep pets under control; do not allow them to run loose.
- Avoid contact with stray pets and wild animals.
- Report stray pets to an animal control officer as well as wild animals that are acting strangely.
- If bitten by an animal, wash the wound with soap and water for 10 to 15 minutes and consult a physician to determine if RPEP, tetanus booster, and antibiotics are needed.
- Have pets spayed or neutered, since pets that are fixed are less likely to stray from home and produce unwanted litters.
- Pets should not be handled without gloves or other protection directly after they have been exposed to wildlife since they might have saliva on their fur from a rabies-infected animal.

Additional Website Resources:

CDC Health Topics

CDIRM

Rabies, animal

Rabies, human

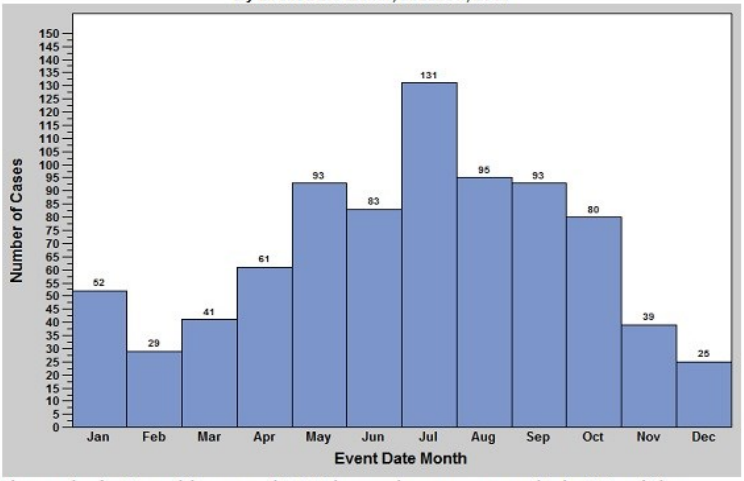
Section A - Communicable Disease Surveillance

Salmonellosis

2013 Case Total 847 **2013 Incidence Rate 14.1 per 100,000**
2012 Case Total 1,071 **2012 Incidence Rate 17.8 per 100,000**

Salmonellosis is an infection with bacteria called *Salmonella*. People get salmonellosis by ingesting contaminated food, water, or contact with infected animals. Salmonellosis affects all age groups. Most persons infected with *Salmonella* develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection. The illness usually lasts four to seven days, and most persons recover without treatment. However, in some persons, the diarrhea may be so severe that the patient needs to be hospitalized. In these patients, the *Salmonella* infection may spread from the intestines to the blood stream, and then to other body sites and can cause death unless the person is treated promptly with antibiotics. The elderly, infants, and those with impaired immune systems are more likely to have a severe illness or complicated disease. Persons with diarrhea usually recover completely, although it may be several months before their bowel habits are entirely normal. A small number of persons with *Salmonella* develop pain in their joints, irritation of the eyes, and painful urination. This is called reactive arthritis. It can last for months or years, and can lead to chronic arthritis which is difficult to treat. For more information on salmonellosis visit: http://www.cdc.gov/salmonella/.

Reported Number of Salmonellosis Cases, Confirmed and Probable
By Event Date Month, Missouri, 2013



*The event date for 25 cases did not occurred in 2013; however the cases were reported in the 2013 morbidity. These cases are not represented in the graph (n=822).

Missouri Incidence: In 2013, salmonellosis decreased by 21% (n=224) when compared to the previous year of 2012, but increased slightly over the five-year median by 0.5%. In addition, a seasonal trend for salmonellosis was noted in Missouri, with 68% of the cases occurring in the warmer months of May through October (n=575).

Salmonellosis
Comparative Statistics by Socio-demographic Category, Missouri 2013[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	483	57%	15.7	473	2.1%
	Male	364	43%	12.3	362	0.6%
Race	Black	95	11.2%	12.8	75	26.7%
	Other	23	2.7%	13.9	12	91.7%
	Unknown	179	21.1%	N/A	175	2.3%
	White	550	64.9%	10.8	581	-5.3%
Age Group	00 to <01	71	8.4%	94.2	65	9.2%
	01 to 04	111	13.1%	36.5	103	7.8%
	05 to 14	110	13%	14	104	5.8%
	15 to 24	81	9.6%	9.7	95	-14.7%
	25 to 39	126	14.9%	11	140	-10%
	40 to 64	217	25.6%	10.9	232	-6.5%
	65 and older	131	15.5%	14.8	120	9.2%
District	Central	84	9.9%	12.5	100	-16%
	Eastern	326	38.5%	14.5	284	14.8%
	Northwest	196	23.1%	12.4	223	-12.1%
	Southeast	117	13.8%	24.6	129	-9.3%
	Southwest	124	14.6%	11.7	128	-3.1%
	State of Missouri	847	100%	14.1	843	0.5%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Persons with salmonellosis ranged in age from four weeks to 94 years, with a median age of 30 years. The highest age specific incidence rates (IR) per 100,000 population occurred among children less than one year of age which was 94.2 cases; followed by children one to four years of age which was 36.5 cases. The highest proportion of cases occurred in the Eastern district with 38.5% of the cases (n=326), resulting in an IR of 14.5 cases per 100,000 population. However, the highest district IR occurred in Southeast which was 24.6 cases per 100,000 population (n=117).

Section A - Communicable Disease Surveillance

Salmonellosis-continued

Central district was 12.5 cases per 100,000 population (n=84), Northwest district was 12.4 cases per 100,000 population (n=196) and Southwest district was 11.7 cases per 100,000 population (n=124).

Females accounted for 57% of the cases, 23.1% (n=196) of the cases were hospitalized[¥] and there were four deaths[¥] in 2013. The race specific IR was higher for the race reported as "Other" with 13.9 cases per 100,000 population (n=23); followed by "Blacks" with 12.8 cases per 100,000 population. Missouri also reported one case of *Salmonella* Typhi (Enteric Fever) for 2013. The case was a 64 year old male with no reported travel prior to onset of illness.

Clinical isolates of *Salmonella* species identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for confirmation, serogroup identification, and analysis by pulsed-field gel electrophoresis (PFGE). The MSPHL confirmed and serogrouped 756 (94%) of the (804) confirmed *Salmonella* cases. This is a decrease from 2012, when 97.2% of the confirmed *Salmonella* cases were submitted to the MSPHL for confirmation and additional testing.

Seventy-one different serogroups were identified in 2013, with the top five being *S.* Typhimurium (27.5%, n=221), *S.* Enteriditis (19.4%, n=156,), *S.* Newport (7.5%, n=60), S. Thompson (3.9%, n=31) and *S.* I 4,5,12:i:- (3.5%, n=28) of typed isolates. Serotyping can be a very useful tool for recognition of outbreaks. The Missouri Department of Health and Senior Services (MDHSS) also utilizes PFGE to detect clusters and/or outbreaks, both in Missouri and nationwide.

In 2013, Missouri reported five *Salmonella* outbreaks. Three of them were multistate outbreaks, that included: *S.* Typhimurium infections linked to live poultry in backyard flocks; *S.* Heidelberg infections linked to Foster Farms brand chicken; and *S.* Typhimurium infections linked to pet hedgehogs (nationally, the hedgehog outbreak was identified in 2012, however Missouri's case onset in 2013.) The afore mentioned five outbreaks were responsible for 7.4% (n=63) of Missouri's cases. Without the above outbreaks, Missouri would have reported 784 cases, which would have been below the five-year median of 843 cases. Outbreaks can have a significant impact on annual disease morbidity as revealed in 2013.

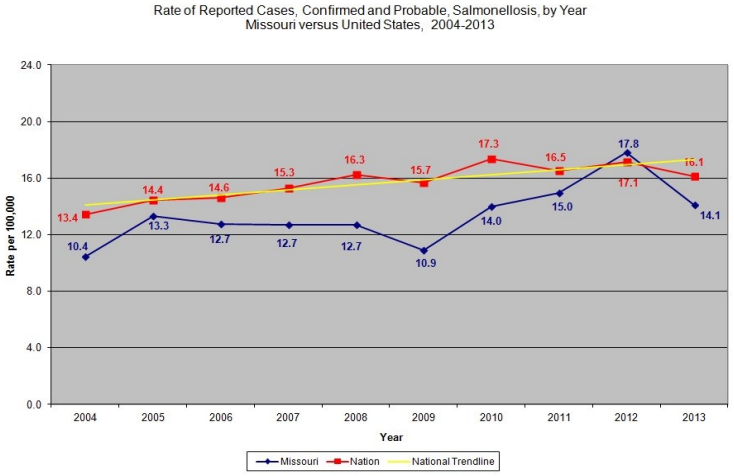
Determining the source of the non-outbreak related *Salmonella* infections is difficult because *Salmonella* are ubiquitously present in the environment and can reside in the gastrointestinal tracts of animals. Similarly, not all outbreak investigations are successful in clearly identifying the source of infection. Most products contaminated with *Salmonella* do not taste or look any different than normal and there are inherit delays in reporting that can impact the investigation.

The Centers for Disease Control and Prevention reported other *Salmonella* outbreaks in the U.S., of which Missouri did not have any associated cases. These outbreaks include: *S.* Montevideo and *S.* Mbandaka infections linked to Tahini Sesame Paste; *S.* Infantis, *S.* Lille, *S.* Newport, and *S.* Mbandaka linked to live poultry; *S.* Saintpaul infections linked to imported cucumbers; *S.* Heidelberg infections linked to chicken; *S.* Typhimurium infections linked to ground beef; and *S.* Sandiego, *S.* Pomona, and *S.* Poona infections linked to small turtles.

Challenges: That have been acknowledged nationally include: identifying unrecognized major sources of *Salmonella* infections; determining the sources of *Salmonella* infections in infants; preventing contamination of vegetables with manure from concentrated animal feeding operations; preventing further

Section A - Communicable Disease Surveillance

Salmonellosis-continued



emergence of highly resistant *Salmonella* strains; controlling *Salmonella* Enteritidis infections through changes in the egg industry; education of food service workers and consumers; and developing effective education methods and materials to prevent reptile-associated salmonellosis.

Comparison to National Data: In 2013, the statewide IR was 14.1 cases per 100,000 population as compared to the national IR of 16.1 cases per 100,000 population. For the years 2004 to 2011, the IR for reported salmonellosis cases in Missouri has been below the national IR. However in 2012, the state IR (17.8 cases per 100,000) was slightly above the national IR (17.1 cases per 100,000 population). The annual rate of reported salmonellosis in Missouri has increased from 2010 through 2012; in 2013 Missouri's IR dropped to 2010 levels and is below the national IR. The national rate remained between 13.4 to 17.1 cases per 100,000 population for the years 2004 to 2013. In Missouri the rate varied from 10.4 to 17.8 cases per 100,000 population for the same years. Approximately 42,000 cases of salmonellosis are reported in the U.S. annually. Because many milder cases are not diagnosed or reported, the actual number of infections may be 29 or more times greater. It is estimated that nationally 400 persons die each year with acute salmonellosis.

It is important that cases continue to be promptly reported and potential sources investigated. The collection of accurate exposure information from the ill persons or their surrogates remains an integral component of public health surveillance. Nationally, the rate of diagnosed infections in children greater than five years old is higher than the rate in all other persons. Young children, the elderly, and the immunocompromised are the most likely to have severe infections or complicated disease. With the increased risk for children, it is important for parents and guardians to implement preventive measures to reduce the risk of disease. There is no vaccine to prevent salmonellosis.

Prevention: Cook poultry, ground beef, and eggs thoroughly. Do not eat or drink foods containing raw eggs, or raw (unpasteurized) milk. For additional information on foodborne illness visit the MDHSS website at: http://health.mo.gov/safety/foodsafety/pdf/befoodsafefactsheet.pdf.

- If you are served undercooked meat, poultry or eggs in a restaurant, do not hesitate to send it back to the kitchen for further cooking.
- Wash hands, kitchen work surfaces, and utensils with soap and water immediately after they have been in contact with raw meat or poultry.
- Be particularly careful with foods prepared for infants, the elderly, and the immunocompromised.
- Wash hands with soap after handling reptiles, birds, or baby chicks, and after contact with pet feces.
- Avoid direct or even indirect contact between reptiles (turtles, iguanas, other lizards, snakes) and infants or immunocompromised persons.
- Do not provide care for an infant (e.g., feed, change diaper) while working with raw poultry or meat.
- Mother's milk is the safest food for young infants. Breastfeeding prevents salmonellosis and many other health problems.
- For additional prevention information visit: http://www.cdc.gov/salmonella/general/prevention.html.

Additional Website Resources:

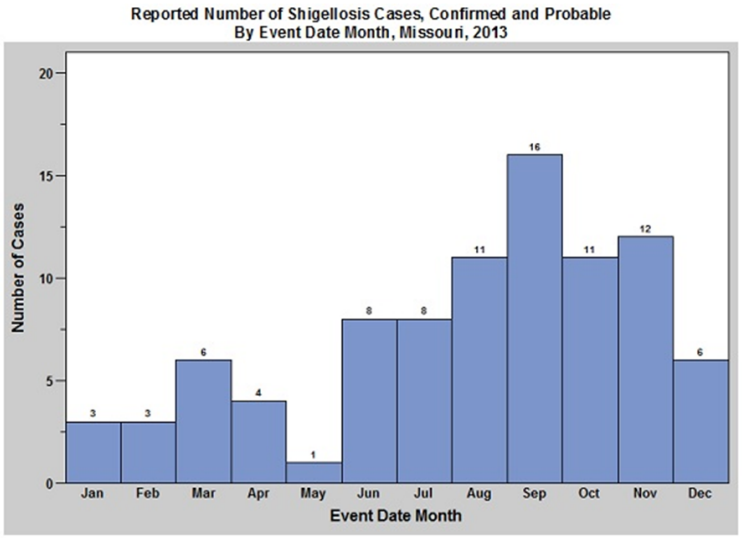
CDC Health Topics CDIRM

Section A - Communicable Disease Surveillance

Shigellosis

2013 Case Total	**89**	**2013 Incidence Rate**	**1.5 per 100,000**
2012 Case Total	**71**	**2012 Incidence Rate**	**1.2 per 100,000**

Shigellosis is an infectious disease caused by a group of bacteria called *Shigella*. The infective dose of *Shigella* can be as low as 10-100 organisms. Most people who are infected with *Shigella* develop diarrhea, fever, and stomach cramps usually starting one to three days after they are exposed to the bacteria. The diarrhea is often bloody. Shigellosis usually resolves in five to seven days in most people. Some people who are infected may have no symptoms at all, but may still pass the *Shigella* bacteria to others. Others who are infected with certain species of *Shigella* may have more severe symptoms requiring antimicrobial therapy. The bacterium is shed in the stools of infected persons. Most people get shigellosis from the bacterium passing from the stools or soiled fingers from one person to the mouth of another person. This can happen when basic hygiene and hand washing habits are inadequate. Shigellosis may also be acquired from eating contaminated food or drinking contaminated water. Food may become contaminated by infected food handlers who do not thoroughly wash their hands with soap and water after going to the bathroom. Fruits and vegetables can become contaminated if they are harvested from fields with sewage in them. Food can also become infected when houseflies transfer the bacteria from infected feces or sewage to uncovered food items. Water can become infected if sewage runs into it or if someone who is infected with *Shigella* swims in or plays in it (especially untreated wading pools, shallow play fountains or splash tables often used by toddlers). Persons swallowing this contaminated water can become infected. Shigellosis affects all age groups but is especially likely to occur among toddlers who are not fully toilet-trained and have not yet developed good hand hygiene, their playmates and caregivers. Most persons infected with *Shigella* that develop diarrhea, recover completely, however, about 2% of those infected with one type of *Shigella*, *Shigella flexneri*, will later develop post-infectious or reactive arthritis. They may suffer from pains in their joints, irritation of the eyes and painful urination that could last for months or years and could lead to chronic arthritis. Reactive arthritis is caused by the body's reaction to the *Shigella* infection and usually happens in people who are genetically predisposed to it. For more information on shigellosis visit: http://www.cdc.gov/shigella/index.html.



Missouri Incidence: In 2013**,** shigellosis increased by 20% (n=18) when compared to the previous year of 2012, but decreased from the five-year median by 60.8%. The reason for this decrease is, cyclical general-community outbreaks have emerged in Missouri (with no general-community outbreak reported in 2013). A seasonal trend for shigellosis was noted in Missouri, with 74% of the cases (n=66) occurring in the months June through November.

Persons with shigellosis ranged in age from one year to 81 years, with a median age of 10 years. The highest age specific incidence rates (IR) per 100,000 population occurred among children five to 14 years of age which was 4.6 cases, followed by children one to four years of age which was 4.3 cases.

Section A - Communicable Disease Surveillance

Shigellosis-continued

The highest proportion of cases occurred in the Eastern district with 62.9% of the cases (n=56), resulting in an IR of 2.5 cases per 100,000 population. The second highest proportion of cases occurred in Northwest district with 21.3% of the cases (n=19), resulting in an IR of 1.2 cases per 100,000 population. However, the second highest district IR occurred in Southeast district which was 1.5 cases per 100,000 population (n=7). The IR in Central was 0.6 cases per 100,000 population (n=4), and in Southwest was 0.3 cases per 100,000 population (n=3).

Shigellosis
Comparative Statistics by Socio-demographic Category, Missouri 2013[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	52	58.4%	1.7	121	-57%
	Male	37	41.6%	1.3	106	-65.1%
Race	Black	9	10.1%	1.2	19	-52.6%
	Other	3	3.4%	1.8	7	-57.1%
	Unknown	17	19.1%	N/A	123	-86.2%
	White	60	67.4%	1.2	141	-57.4%
Age Group	00 to <01	0	0%	0	5	-100%
	01 to 04	13	14.6%	4.3	79	-83.5%
	05 to 14	36	40.4%	4.6	71	-49.3%
	15 to 24	8	9%	1	17	-52.9%
	25 to 39	19	21.3%	1.7	42	-54.8%
	40 to 64	11	12.4%	0.6	25	-56%
	65 and older	2	2.2%	0.2	6	-66.7%
District	Central	4	4.5%	0.6	13	-69.2%
	Eastern	56	62.9%	2.5	158	-64.6%
	Northwest	19	21.3%	1.2	50	-62%
	Southeast	7	7.9%	1.5	18	-61.1%
	Southwest	3	3.4%	0.3	89	-96.6%
	State of Missouri	89	100%	1.5	227	-60.8%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Females accounted for 58.4% of the cases (n=52), 14.6% of the cases (n=13) were hospitalized[¥] and there were no deaths[¥] in 2013. The race specific IR was higher for the race reported as "Other" with 1.8 cases per 100,000 population (n=3); both "Blacks" and "Whites" had 1.2 cases per 100,000 population (n=9) and (n-60) respectively.

Clinical isolates of *Shigella* species identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for confirmation, species and serogroup identification. The MSPHL confirmed and serogrouped 63 (88.7%) of the 71 lab confirmed shigellosis cases.

Two different species were identified in 2013, 62.92% (n=56) were *Shigella sonnei,* 15.73% (n=14) were *Shigella flexneri,* and 1.12% (n=1) was unspecified.

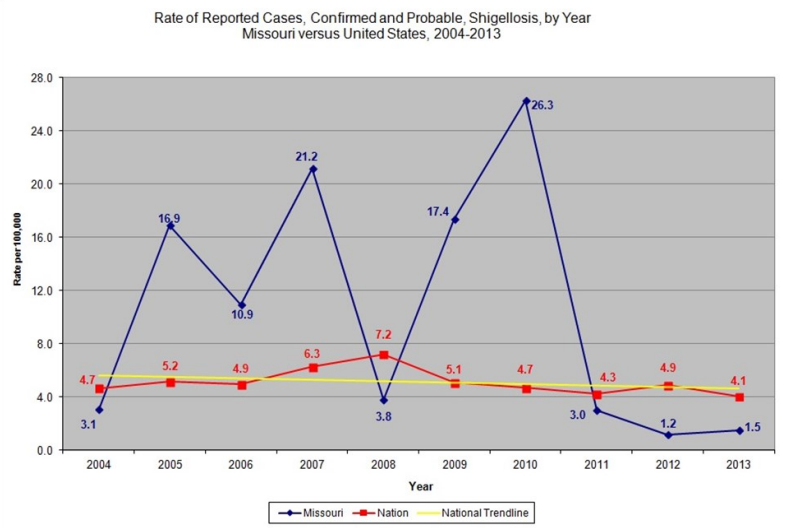
In 2013, Missouri reported one *Shigella* outbreak. This outbreak occurred in a grade school setting and accounted for 15 cases. All of the cases in this outbreak were *Shigella sonnei* and the transmission was person to person. There was no contaminated food or drink identified in this outbreak. There were no multi-state *Shigella* outbreaks for which Missouri reported cases.

Challenges: That have been acknowledged nationally include: increased resistance to antimicrobial agents among isolates acquired both domestically and abroad; absence of effective vaccines; modifying hand washing behavior to control prolonged community-wide outbreaks; identifying targeted prevention measures in high-risk groups.

Comparison to National Data: In 2013, the statewide IR was 1.5 cases per 100,000 population as compared to the 2013 national IR of 4.7 cases per 100,000 per population. While the national IR for *Shigella* has remained relatively stable from 2004 through 2012, there have been fluctuations in Missouri's IR. For the year 2004, the IR for reported *Shigella* cases in Missouri was 3.1 cases per 100,000 population which was below the national IR of 4.7 cases per 100,000 population for that same year. However, in the years 2005 through 2007 the state IR was significantly above the national IR. The Missouri IR varied from 16.9 to 21.2 cases per 100,000 population for the years 2005 to 2007 while the national IR remained between 5.2 and 6.3 cases per 100,000 population for the same years. In 2008, the Missouri IR dropped to 3.8 cases per 100,000 population which was well below the national IR of 7.2 cases per 100,000 population.

Section A - Communicable Disease Surveillance

Shigellosis-continued



The national IR remained between 5.1 to 4.7 cases per 100,000 population for the years 2009 to 2010. In Missouri the IR varied from 17.4 to 26.3 cases per 100,000 population for the same years, once again rising well above the national IR. In 2011, Missouri again dropped below the national IR with a statewide IR of 3.0 cases per 100,000 population with the national IR being 4.3 cases per 100,000 population. Missouri's IR has stayed below the national IR since 2011 with state IR from 3.0 to 1.5 cases per 100,000 population while the national IR ranged from 4.3 to 4.1 cases per 100,000 population during that same time. Cyclical general-community outbreaks have emerged in Missouri resulting in increased cases which coincide with the state's IR being above the corresponding national IR. The exception is 2010, that year had the highest Missouri IR of 26.17 cases per 100,000 population, but no general-community shigellosis outbreak was reported. However, a general-community shigellosis outbreak did occur in the Northwest district which began in December 2009.

It is estimated that *Shigella* causes nearly half a million illnesses each year in the U.S., with more than 5,400 hospitalizations and 38 deaths. Although all *Shigella* infections are nationally notifiable, many cases are likely not recognized for various reasons. Not all persons ill with *Shigella* infection will seek medical care, healthcare providers may not obtain a specimen for laboratory diagnosis, or the clinical diagnostic laboratory may not perform the necessary diagnostic tests. It is important that cases continue to be promptly reported and potential sources investigated. The collection of accurate exposure information from the ill persons or their surrogates remains an integral component of public health surveillance. Nationally, the rate of diagnosed infections is highest in children <5 years of age. Young children, the elderly, and the immunocompromised are the most likely to have severe infections or complicated disease. With the increased risk for children, it is important for parents and guardians to implement preventive measures to reduce the risk of disease. There is no vaccine to prevent shigellosis.

Prevention: Strict attention to good hand hygiene is essential to limit the spread of *Shigella*. Wash hands with soap and water carefully and frequently; especially after going to the bathroom; after changing diapers; and before preparing food or beverages. Special attention should be paid to preventing the spread of the illness in families with children and in child-care settings.

- Dispose of soiled diapers properly.
- Disinfect diaper changing areas after using them.
- Keep children with diarrhea out of child-care settings.
- Supervise hand washing of toddlers and small children after they use the toilet.
- Do not prepare food or beverages for others while ill with diarrhea.
- Carefully wash all fruits and vegetables before eating.
- Take measures to decrease contamination of food and surfaces by houseflies.

Section A - Communicable Disease Surveillance

Shigellosis-continued

- Improved sanitation, a safe water supply through chlorination.
- Refrain from attending or allowing your children to attend recreational water venues such as swimming pools, water parks, wading pools, shallow play fountains or splash tables while ill with diarrhea and for one week after symptoms have resolved.
- Avoid swallowing water from ponds, lakes or untreated pools. (For more information visit Healthy Swimming: http://www.cdc.gov/healthywater/swimming/ .
- When traveling to developing world drink only treated, boiled, or bottled water and eat only cooked hot foods or fruits you peel yourself.

For additional prevention information visit: http://www.cdc.gov/shigella/general-information.html or FoodSafety.gov on shigellosis to learn more information on how to prevent shigellosis.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

Tuberculosis (TB) and Latent Tuberculosis Infection (LTBI)

2013 TB Case Total	**104**	**2013 Incidence Rate**	**1.7 per 100,000**
2012 TB Case Total	**89**	**2012 Incidence Rate**	**1.5 per 100,000**
2013 LTBI Case Total	**3,274**	**2013 Incidence Rate**	**54.4 per 100,000**
2012 LTBI Case Total	**2,601**	**2012 Incidence Rate**	**43.3 per 100,000**

TB is a disease caused by the bacterium *Mycobacterium tuberculosis* (*M. tuberculosis*). *M. tuberculosis* can infect any part of the body, but it usually infects the lungs. *M. tuberculosis* is spread through the air from one person to another. The bacteria are expelled into the air when a person with TB disease of the lungs or throat coughs, sneezes, speaks or sings. The bacteria can stay in the air for several hours, depending on the environment. People who become infected with *M. tuberculosis* usually have had very close, day-to-day contact with someone who has TB disease (e.g. a family member, friend, or close co-worker). Persons are not likely to become infected from someone coughing in line at a supermarket or restaurant. In addition, items such as dishes, drinking glasses, sheets, or clothing do not spread TB.

Persons at greatest risk for exposure to TB include; close contacts of a person with known or suspected TB disease, foreign-born persons from areas where TB is common, resident or employee of high-risk congregate settings such as jails, prisons, homeless shelters and nursing homes, and health care workers. Persons at higher risk for developing disease once infected include HIV-positive persons, persons with other certain medical conditions, and the medically underserved.

Infection with *M. tuberculosis* causes two TB-related conditions called LTBI and TB disease. Most persons who become infected with *M. tuberculosis* develop an infection called LTBI. The body is able to fight the bacteria and prevent it from multiplying and spreading. Persons with LTBI are infected with *M. tuberculosis* although have no symptoms and do not feel sick. Persons with LTBI are not infectious and cannot spread *M. tuberculosis* to others. However, if *M. tuberculosis* become active and multiply, the person will go from having LTBI to being sick with TB disease and potentially be infectious to others.

Symptoms of TB disease will depend on where in the body the *M. tuberculosis* has infected and is multiplying. TB disease of the lungs may cause a bad cough that lasts longer than three weeks, pain in the chest, coughing up blood or sputum (phlegm from deep inside the lungs). Other symptoms of TB disease are weakness or fatigue, weight loss, no appetite, chills, fever, and sweating at night. For more information on LTBI or TB disease visit: http://health.mo.gov/living/healthcondiseases/communicable/tuberculosis/index.php or http://www.cdc.gov/tb/.

Missouri Incidence: Statewide in 2013, a total of 104 cases of TB disease were reported in Missouri. This represents a statewide incidence rate (IR) of 1.7 cases per 100,000 population. TB disease increased by 6.1% when compared to the previous five-year median data from 2008-2012. The reason for this increase is unknown.

Persons with TB disease ranged in age from one to 92 years of age, with a median age of 51years. The highest age specific IR of 3.1 cases per 100,000 population was observed in persons 65 years of age and older, followed by persons one to four years of age with an IR of 2.3 cases per 100,000 population. Persons 40 years of age and older accounted for 67.3% of the TB disease cases in Missouri. The highest proportion of cases (44.2%) occurred in the Eastern district, resulting in an IR of 2.1 cases per 100,000 population (n=46). The Northwest district IR was also 2.1 cases per 100,000 population (n=33). The remaining district IR were 1.8 cases per 100,000 population (n=12) in the Central, 1.1 cases per 100,000 population

Section A - Communicable Disease Surveillance

TB and LTBI-continued

(n=5) in the Southeast, and 0.8 cases per 100,000 population (n=8) in the Southwest district. The IR of TB disease for some of the larger population areas of the state include: Kansas City 3.7 cases per 100,000 population (n=17), St. Louis City 5.0 cases per 100,000 population (n=16), St. Louis County 2.5 cases per 100,000 population (n=25) and 1.1 cases per 100,000 population (n=3) in Springfield/Greene County.

Tuberculosis
Comparative Statistics by Socio-demographic Category, Missouri 2013[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	41	39.4%	1.3	37	10.8%
	Male	63	60.6%	2.1	59	6.8%
Race	Black	27	26%	3.6	31	-12.9%
	Other	36	34.6%	21.8	23	56.5%
	White	41	39.4%	0.8	38	7.9%
Age Group	00 to <01	0	0%	0	1	-100%
	01 to 04	7	6.7%	2.3	2	250%
	05 to 14	0	0%	0	1	-100%
	15 to 24	9	8.7%	1.1	12	-25%
	25 to 39	18	17.3%	1.6	24	-25%
	40 to 64	43	41.3%	2.2	33	30.3%
	65 and older	27	26%	3.1	22	22.7%
District	Central	12	11.5%	1.8	6	100%
	Eastern	46	44.2%	2.1	48	-4.2%
	Northwest	33	31.7%	2.1	23	43.5%
	Southeast	5	4.8%	1.1	10	-50%
	Southwest	8	7.7%	0.8	10	-20%
	State of Missouri	104	100%	1.7	98	6.1%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

In 2013, males accounted for 60.6% of the TB disease cases, 59.6% (n=62) of the cases were hospitalized[¥] and there were 10 deaths[¥]. Eight of the fatal cases of TB disease died during treatment and two were diagnosed at death. The age range for those persons who died with TB disease in Missouri was 40 to 92 years, with a median age of 74.5 years.

Forty-eight percent (n=50) of TB disease cases in Missouri during 2013 were born outside of the U.S., but were diagnosed with TB disease while residing in Missouri. This represents a 3% increases in the foreign-born TB disease cases compared to 2012. Foreign-born TB disease cases continue to comprise a significant portion of TB disease in Missouri.

Fifteen percent of the TB disease cases in Missouri were considered preventable in 2013, as compared to 2005, when 57% of the cases in Missouri were considered preventable. The decrease in preventable cases is due to improved case management, contact investigations, and documentation. These improvements are the result of a number of factors such as improved program management and training, implementation of the cohort review process, quality assurance goals, and to other factors.

Clinical isolates of *M. tuberculosis* identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for confirmation and epidemiological analysis. The MSPHL tested 100% (n=79) of the culture confirmed TB disease cases (18 cases were clinical cases and 14 physician diagnosed and cultures were not available). Of the 79 culture confirmed TB cases in Missouri, 67% (n=53) were pulmonary TB, 33% (n=26) were extra-pulmonary and seven cases had both pulmonary and extra pulmonary TB disease. Of the 53 cases with pulmonary TB 45% (n=24) were identified at the MSPHL using Gen-Probe MTD NAA testing from diagnostic clinical specimens.

No TB disease outbreaks were reported in Missouri during 2013, however after receiving information that five TB disease cases reported from September 2011 through December 2012 had association with a call in center in Eastern Missouri, an extended TB contact investigation was conducted at the facility. There were 228 contacts evaluated, with nine of these contacts diagnosed with LTBI. No additional TB disease was identified as a result of this contact investigation.

The Columbia Regional Care Center (CRCC) in Columbia, South Carolina serves as the state TB referral hospital. In 2013, CRCC treated four TB disease patients from Missouri.

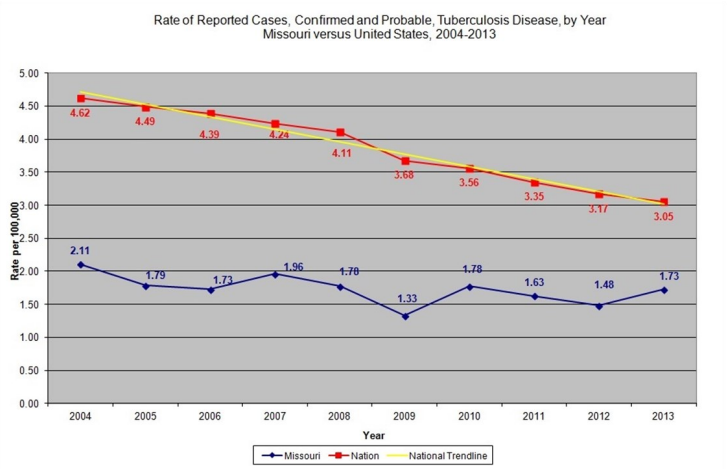
Section A - Communicable Disease Surveillance

TB and LTBI - continued

Latent Tuberculosis Infection Comparative Statistics by Health Regions, Missouri 2013[1]					
	Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Central	558	17%	83.3	275	102.9%
Eastern	1,405	42.9%	62.7	1,156	21.5%
Institutionalized	81	2.5%	256.8	140	-42.1%
Northwest	759	23.2%	48.1	544	39.5%
Southeast	85	2.6%	17.9	126	-32.5%
Southwest	386	11.8%	36.5	450	-14.2%
State of Missouri	3,274	100%	54.4	2,601	25.9%

[1]Socio-demographic Category Information is missing for most Tuberculosis Infection Data.
Data Source: Missouri Health Information Surveillance System (WebSurv).

A total of 3,274 cases of LTBI were reported from Missouri in 2013. The reason for this increase is unknown, however Section 199.290 (2)-(3), RSMo. went into effect August 2013 which requires all institutions of higher education in Missouri to implement a targeted testing program. Also there may be an issue with health care providers interpreting the TB skin test appropriately. Missouri is one of only a few states that require the reporting of persons with LTBI. The reason for this is approximately 10% of persons with LTBI will develop TB disease in their lifetime if not treated. The treatment of LTBI substantially reduces the risk that persons infected with *M. tuberculosis* will progress to TB disease. Usually a person with LTBI has a normal chest x-ray and a negative sputum smear with a positive TST (tuberculin skin test) or blood test result (IGRA) indicating TB infection. For more information on LTBI treatment visit: http://www.cdc.gov/tb/topic/treatment/default.htm.



Comparison to National Data: The statewide IR in 2013 was 1.73 cases per 100,000 population, a 6.1% increase from the previous five-year median. The national IR for 2013 was 3.05 cases per 100,000 population. For the years 2003 to 2012, the IR of TB disease in Missouri has consistently been below the corresponding rate nationally. Over the past 17 years, Missouri also observed a steady decline in the number of TB disease cases from 224 cases in 1996 to 89 cases in 2012. Nationally in 2013, 65% of all TB disease cases were in individuals who were born outside of the U.S., as compared to 44.2% in Missouri.

Challenges: Even though the number of reported TB disease cases continues to decline, both in Missouri and nationally, many TB related challenges exist including:

- Assuring all TB disease patients complete their treatment regimen. Treating a patient with TB disease requires at least six months of a multiple-drug regimen. Treating individuals with drug-resistant TB requires costly medications that may be used for an extended period of time. The all drug therapy (ADT), percentage for completion of therapy (COT) was 97% for cases in Missouri as compared to the national ADT/COT of 93% (in Missouri n=91 with 88 patients completing therapy; 10 cases died, with three cases still on treatment; three cases their health care provider decided to stop treatment).
- Improve delays in detecting, reporting and treating cases of pulmonary TB disease (e.g. people are being diagnosed in the hospital or at death with TB disease).
- Locating, testing and treating all contacts to infectious TB disease cases. (Younger TB disease patients tend to have a greater number of contacts that must be found for testing and treatment.)
- The prevalence of TB disease among foreign-born person residing in Missouri.

Section A - Communicable Disease Surveillance

TB and LTBI - continued

- The presence of a substantial population of persons living with LTBI who are at risk for progression to TB disease, who opt not to take LTBI treatment. LTBI is generally treated with one medication for nine to 12 months.
- Maintaining clinical and public health expertise in an era of declining TB disease incidence.

Persons with pulmonary TB disease can be infectious, therefore prompt treatment of all TB disease is essential to end symptoms, prevent disability or death, and prevent transmission of TB disease to others. It is critically important that TB disease cases be detected early and promptly reported to public health for case management (to ensure COT) and investigation, so contacts can be identified, tested and treated as appropriate. The collection of accurate exposure information from TB disease cases or their surrogates continues to be an integral component of public health surveillance.

Prevention: There are certain things persons with TB disease who are infectious can do to protect themselves and others. The most important is to take the medications as prescribed. Persons with pulmonary TB disease should always cover their mouth with a tissue when coughing, sneezing, or laughing and then place the tissue in a closed bag and throw it away. Persons infectious with TB disease should also separate themselves from others and avoid close contact with anyone (e.g. do not go to work, school, or be around other people until approved to do so by public health officials). In addition they should sleep in a bedroom away from other family members. Air out their room as often as possible to the outside of the building (weather permitting). TB spreads in small, closed spaces where air does not move. Put a fan in the window to blow out (exhaust) air that may be filled with *M. tuberculosis* . If other windows in the room are opened, the fan also will pull in fresh air. This will reduce the chances that *M. tuberculosis* will stay in the room and infect someone who breathes the air.

Remember, TB is spread through the air. People cannot get infected with *M. tuberculosis* through handshakes, sitting on toilet seats, or sharing dishes and utensils with someone who has TB disease. After taking medication, as directed, for two to three weeks, you may no longer be able to spread TB to others. Persons with TB disease will be able to go back to their daily routine once the medical providers and public health officials agrees they are no longer infectious to others. Remember, persons with TB disease will get well only by taking their medicine exactly as directed. Please refer to http://www.cdc.gov/tb/publications/factseries/prevention_eng.htm for additional tuberculosis information.

Additional Website Resources:

CDC Health Topics

TB Case Management Manual

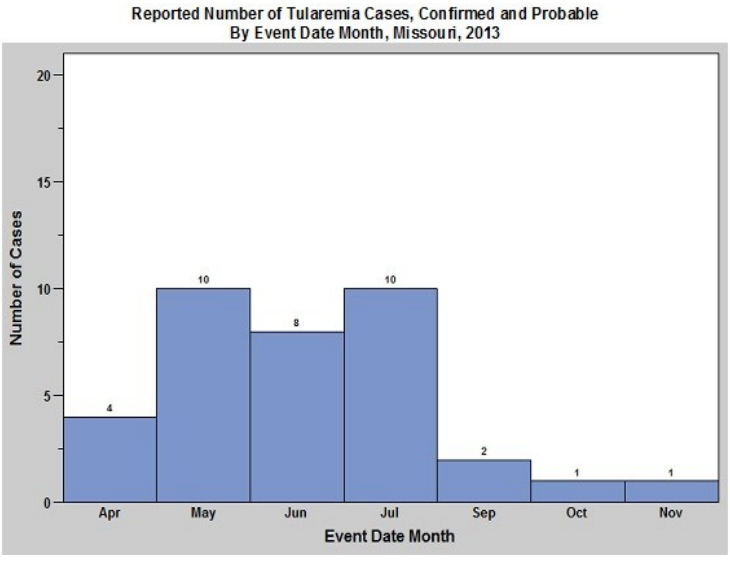
Section A - Communicable Disease Surveillance

Tularemia

2013 Case Total 36 **2013 Incidence Rate 0.6 per 100,000**
2012 Case Total 27 **2012 Incidence Rate 0.4 per 100,000**

Tularemia is a disease of animals and humans caused by the bacterium *Francisella tularensis* (*F. tularensis*). Rabbits, hares, and rodents are especially susceptible and often die in large numbers during outbreaks. *F. tularensis* is a very infectious bacterial species; exposure to as few as 10-50 organisms can cause disease. Humans may be infected by several different routes including tick and deer fly bites, skin contact with infected animals, ingestion of contaminated water, laboratory exposure, or inhalation of contaminated dusts or aerosols. In addition, humans could be exposed as a result of bioterrorism. Symptoms vary depending upon the route of infection. Symptoms usually appear three to five days after exposure to the bacteria, but it can take as long as 21 days for them to appear. Common symptoms are abrupt onset of fever and chills. These symptoms typically last for several days, then remit for a brief interval, and then recur. Additional symptoms can include pulse-temperature dissociation, headache, anorexia, malaise and fatigue or prostration, myalgia, cough, vomiting, pharyngitis, and abdominal pain. There are several different clinical presentations of tularemia related to the route of exposure. Of the 36 reported cases in 2013, 25% (n=9) were classified as ulceroglandular, 22.2% (n=8) were classified as other, 16.7% (n=6) were glandular and 16.7% (n=6) were typhoidal, 8.3% (n=3) were classified as pneumonic, 5.5% (n=2) were intestinal, 2.8% (n=1) were oculoglandular, and 2.8% (n=1) of cases were classified as unknown. Secondary pneumonitis may occur in 45-83% of patients with the typhoidal form of tularemia. Up to 20% of patients may have a rash.

F. tularensis is very infectious, but the bacteria are not spread from person-to-person. Untreated tularemia has a mortality rate of 5-15%, but if treated, the disease carries a mortality rate of 1-3%. Tularemia may lead to months of debility in some people, usually associated with late lymph node suppuration or persistent fatigue. Patients with severe disease may manifest disseminated intravascular coagulation, renal failure, rhabdomyolysis, jaundice, and hepatitis. Features associated with a worse prognosis include increased age, serious coexisting medical conditions, symptoms lasting one month or longer before treatment, significant pleuropulmonary disease, typhoidal illness, renal failure, a delay in the diagnosis and inappropriate antibiotic therapy. For more information visit: http://www.cdc.gov/tularemia/index.html.



Missouri Incidence: Missouri typically leads the nation in the number of tularemia cases reported each year. In 2013, tularemia increased by 71.4% when compared to the five-year median data from 2008-2012. A seasonal trend for tularemia was noted in Missouri with 83.3% (n=30) of the cases occurring in the months of May through September.

Persons with tularemia ranged in age from three to 88 years, with a median age of 51 years.

Section A - Communicable Disease Surveillance

Tularemia-continued

The highest age specific incidence rates (IR) in Missouri occurred among children between one to four years of age with a rate of 1.3 cases per 100,000 population. Adults 40 to 64 years of age had the second highest age specific IR at 1.0 case per 100,000 population.

The highest percentage of cases were reported in the Southwest district, totaling 38.9% (n=14) of all Missouri cases. However, the highest IR among all of the districts occurred in Southeast with 2.1 cases per 100,000 population (n=10). Central district had 0.4 cases per 100,000 population (n=3), Southwest had 1.3 cases per 100,000 population (n=14), Northwest reported 0.4 cases per 100,000 population (n=6) and Eastern district had 0.1 cases per 100,000 population (n=3).

Tularemia
Comparative Statistics by Socio-demographic Category, Missouri 2013[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	15	41.7%	0.5	7	114.3%
	Male	21	58.3%	0.7	11	90.9%
Race	Black	1	2.8%	0.1	0	N/A
	Unknown	4	11.1%	N/A	2	100%
	White	31	86.1%	0.6	19	63.2%
Age Group	00 to <01	0	0%	0	0	0%
	01 to 04	4	11.1%	1.3	2	100%
	05 to 14	3	8.3%	0.4	3	0%
	15 to 24	1	2.8%	0.1	1	0%
	25 to 39	3	8.3%	0.3	2	50%
	40 to 64	20	55.6%	1	6	233.3%
	65 and older	4	11.1%	0.5	6	-33.3%
	Unknown	1	2.8%	N/A	0	N/A
District	Central	3	8.3%	0.4	3	0%
	Eastern	3	8.3%	0.1	2	50%
	Northwest	6	16.7%	0.4	3	100%
	Southeast	10	27.8%	2.1	3	233.3%
	Southwest	14	38.9%	1.3	8	75%
	State of Missouri	36	100%	0.6	21	71.4%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

In Missouri, males account for 58.3% of the cases. In 2013, 58.3% (n=21) of the reported cases required hospitalization[¥] and there were three deaths[¥]. Only clinical isolates of pneumonic tularemia identified by laboratories are required to be submitted to the Missouri State Public Health Laboratory (MSPHL) for testing and confirmation. There were three pneumonic tularemia cases reported with the MSPHL testing 66.7% or two of the three reported cases. The 71.4% increase in tularemia reports over the five-year median may be due to a number of seasonal factors, to the local variability in the tick population, to the level of disease in rabbits and other primary hosts, or to other unknown factors.

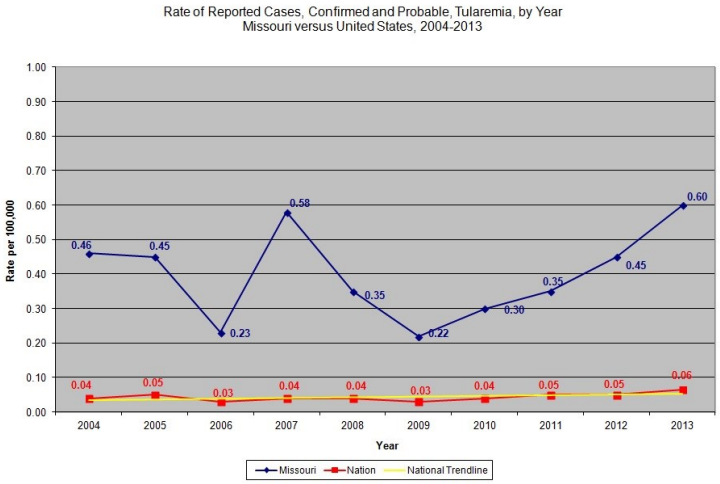
Challenges: Tularemia is a potentially deadly disease that can be difficult to diagnose as the symptoms can be mistaken for other more common illnesses. For this reason, it is important for persons with symptoms of tularemia to seek medical care and inform their health care provider of any likely exposures, such as tick and deer fly bites, or contact with sick or dead animals. In Missouri, human infections attributable to bites from cats that have killed infected wildlife, such as rabbits, are common. Occasionally, human case investigations are unsuccessful in identifying a specific exposure. In the U.S., a live attenuated vaccine strain had been used to protect laboratory employees routinely working with *F. tularensis*; until recently, this vaccine was available as an investigational new drug. It is currently under review by the U.S. Food and Drug Administration (FDA) and its future availability is undetermined. Developing effective education methods and materials to prevent tularemia is also an ongoing public health challenge.

Comparison to National Data: Tularemia is relatively rare condition in the U.S. with only 93-203 cases (median=135 cases) reported nationally for the period 2004-2013. In 2013, the statewide IR was 0.60 cases per 100,000 population. Missouri was well above the national IR for 2013, which was reported as 0.06 cases per 100,000 population (n=203). An increase in the annual IR of reported tularemia cases in Missouri was observed during the past four years beginning in 2010. Missouri reported 240 cases of tularemia (the highest number of cases in the nation) for the 10 year period 2004 to 2013. This represents 17.4% of all

Section A - Communicable Disease Surveillance

Tularemia-continued

tularemia cases reported nationally.



However, the highest state IR for 2013 occurred in Arkansas, which was 1.28 cases per 100,000 population (n=38), followed by Kansas with 0.97 cases per 100,000 population (n=28), Nebraska with 0.91 cases per 100,000 population (n=17), South Dakota with 0.83 cases per 100,000 population (n=7), and Missouri with 0.60 cases per 100,000 population (n=36).

Nationally, tularemia is more common in the months of May through September resulting from the bites of infected ticks or deer flies, but illness due to animal handling and hunting can occur at any time of the year. Nationally tularemia occurs in persons of all ages, but is most common in children. In addition, tularemia is generally more common in males, possibly because of a greater likelihood of exposure through hunting and landscaping.

If *F. tularensis* were used as a weapon (bioterrorism), the bacteria would likely be made airborne for exposure by inhalation. People who inhale an infectious aerosol would generally experience severe respiratory illness, including life-threatening pneumonia and systemic infection, if they are not treated. *F. tularensis* occur widely in nature and could be isolated and grown in quantity in a laboratory, although manufacturing an effective aerosol weapon would require considerable sophistication. Therefore, it is important that tularemia continue to be promptly reported and investigated. The collection of accurate exposure information from ill persons or their surrogates remains an integral component of public health surveillance.

Given the historic and continued high incidence of tularemia in Missouri, it is important for Missourians to protect themselves from exposure to this potentially deadly disease. There is no reason to stop enjoying the great outdoors. By following a few simple precautions, people can continue to interact with nature and reduce the risk of developing illnesses including tularemia.

Prevention:

1. When hiking, camping or working outdoors:
   - Use insect repellants containing 20% to 30% DEET, picaridin or IR3535.
   - Wear long pants, long sleeves, and long socks to keep ticks off your skin.
   - Remove attached ticks promptly with fine-tipped tweezers.
2. Don't drink untreated surface water.
3. When mowing or landscaping:
   - Don't mow over sick or dead animals.
   - Consider using dust masks to reduce your risk of inhaling the bacteria.
4. If you hunt, trap or skin animals:
   - Use gloves when handling animals, especially rabbits, muskrats, prairie dogs, and other rodents.
   - Cook game meat thoroughly before eating.

Additional Website Resources:

CDC Health Topics

CDIRM

Section A - Communicable Disease Surveillance

West Nile Virus Neuroinvasive Disease

2013 Case Total	**25**	**2013 Incidence Rate**	**0.42 per 100,000**
2012 Case Total	**18**	**2012 Incidence Rate**	**0.30 per 100,000**

West Nile virus (WNV) is an arthropod-borne *flavivirus* most commonly spread by infected mosquitoes. The virus is transmitted to humans predominantly by mosquitoes of the *Culex* species, including the northern and southern house mosquito and the western encephalitis mosquito. The virus is maintained in nature in a bird-to-mosquito-to-bird transmission cycle, but human infections in North America occur primarily in the late summer and early fall when *Culex* species mosquitoes are at the peak of their annual reproductive cycle. The illness caused by the virus was first described in Africa in 1937, with outbreaks occurring later in Asia, Europe, and the Middle East.

Since the discovery of its North American introduction in 1999, WNV has expanded to the 48 contiguous states (not including Hawaii or Alaska). According to the Centers for Disease Control and Prevention (CDC), evidence of transmission in the form of infected humans, mosquitoes, birds, horses, or other mammals has been reported from 96% of the counties in the U.S. Anyone living in an area where WNV is present in mosquitoes can become infected. The risk of infection is highest for people who work outside or participate in outdoor activities because of greater exposure to mosquitoes. People with certain medical conditions, such as cancer, diabetes, hypertension and kidney disease are at greater risk for serious illness. The incubation period for WNV disease is usually two to six days but ranges two to 14 days and can be 21 days in immunocompromised people.

An estimated 70-80% of human WNV infections are subclinical or asymptomatic. Most symptomatic people experience an acute flu-like illness that can include a fever, headache, and muscle aches. Gastrointestinal complaints and a temporary spotted rash are also commonly reported. Less than 1% of infected persons develop a serious neurologic infection called West Nile virus neuroinvasive disease (WNND), which typically manifests as meningitis, encephalitis, or acute flaccid paralysis. WNV meningitis is clinically indistinguishable from aseptic meningitis caused by other viruses. Patients with WNV encephalitis usually present with seizures, mental status changes, focal neurologic deficits, or movement disorders. Most patients with non-neuroinvasive WNV disease or WNV meningitis recover completely, but fatigue, malaise, and weakness can linger for weeks or months after the initial infection. About 10% of people who develop WNND will die.

No vaccine or specific antiviral treatments for WNV infection are available. Over-the-counter pain relievers can be used to reduce fever and relieve some symptoms. In severe cases, patients often need to be hospitalized to receive supportive treatment, such as intravenous fluids, pain medication, and nursing care. For more information on WNND visit: http://www.cdc.gov/westnile/index.html.

Missouri Incidence: In 2012, WNND increased by 317% (n=25) when compared to the five-year median data from 2008-2012. Cases were reported from 16 city/county public health jurisdictions, including St. Louis City and Kansas City. In Missouri, the 25 cases were seen in the months of August (n=2), September (n=17), and October (n=6). Infections are generally seasonal. Persons with WNND ranged in age from 15 to 80 years, with a median age of 61 years. The highest age specific incidence rates (IR) per 100,000 population occurred among adults 65 years of age and older, which was 1.0 case; followed by 0.5 cases among adults 40-64 years of age. Over 75% of the reported illnesses were in persons 40 years of age and older. This reported disease burden is characteristic of WNV infection; to produce more severe illness

Section A - Communicable Disease Surveillance

West Nile Virus Neuroinvasive Disease-continued

in older people. The overall statewide IR of WNND cases in Missouri for the year 2013 was 0.4 cases per 100,000 population. The highest proportion of cases occurred in the Eastern district, which accounted for 44% (n=11) of the cases. The highest district specific IR of 0.6 cases per 100,000 population was observed in Northwest district (n=9). The IR for the remaining districts included 0.5 cases per 100,000 population for Eastern (n=11), 0.3 cases per 100,000 population for Central (n=2) and Southwest (n=3), and Southeast district reported no cases. An 800% (n=9) increase in reported cases compared to the previous five-year median was observed in the Northwest district, a 175% (n=11) increase was reported in Eastern, and a 200% (n=3) increase was reported in Southwest district. The reason for this increase is unknown, but could be the result of greater circulation of the *flavivirus* in nature, increased awareness, greater access to diagnostic tests, better reporting, or to other factors not yet identified.

West Nile Virus Neuroinvasive Disease
Comparative Statistics by Socio-demographic Category, Missouri 2013[1]

		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	12	48%	0.4	2	500%
	Male	13	52%	0.4	4	225%
Race	Black	3	12%	0.4	2	50%
	Unknown	6	24%	N/A	2	200%
	White	16	64%	0.3	4	300%
Age Group	00 to <01	0	0%	0	0	0%
	01 to 04	0	0%	0	0	0%
	05 to 14	0	0%	0	0	0%
	15 to 24	2	8%	0.2	0	N/A
	25 to 39	4	16%	0.3	1	300%
	40 to 64	10	40%	0.5	4	150%
	65 and older	9	36%	1	2	350%
District	Central	2	8%	0.3	0	N/A
	Eastern	11	44%	0.5	4	175%
	Northwest	9	36%	0.6	1	800%
	Southeast	0	0%	0	1	-100%
	Southwest	3	12%	0.3	1	200%
	State of Missouri	25	100%	0.4	6	317%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Males accounted for 52% of reported WNND cases in Missouri. This finding is consistent with blood bank studies indicating that while men and women generally have similar WNV infection rates, men tend to have a slightly higher incidence of neuroinvasive disease. Eighty-four percent (n=21) of the cases were hospitalized[¥] and there was 1 death[¥] reported in 2013. Sixty-four percent of the WNND cases in Missouri were reported as being white; however, racial identity was missing for 24% of the cases.

Clinical isolates of WNND identified by laboratories are not required to be submitted to the Missouri State Public Health Laboratory for confirmation or identification and there were no outbreaks of WNND reported in Missouri for 2013.

Challenges: Public health challenges associated with WNV include the lack of a licensed vaccine in humans to prevent infections and specific antiviral treatment for persons with WNV disease. The development of effective education methods and materials pertaining to personal protective measures to prevent WNV infection is an ongoing public health challenge.

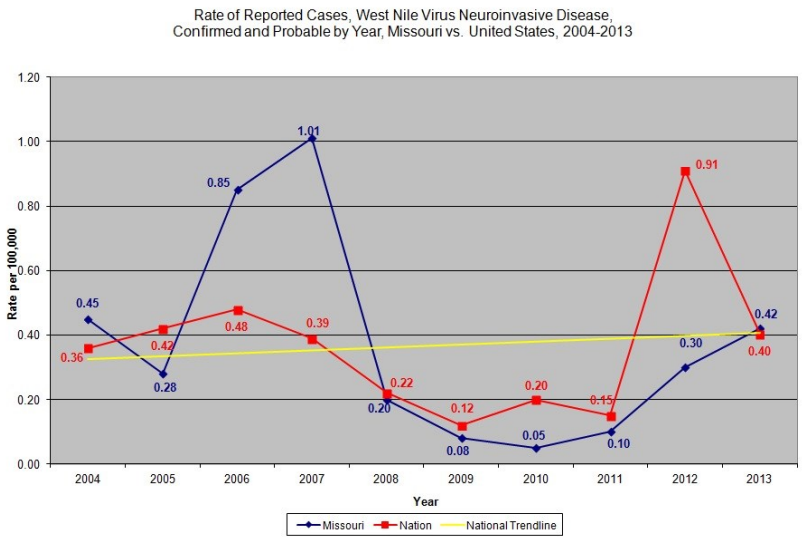
In addition, the ecology of WNV in the U.S. is complex and varies considerably with geography. Outbreaks have been associated with a variety of biotic and abiotic factors, including urban habitats in northeastern states, agricultural habitats in western states, rural irrigated landscapes, increased temperature, specific precipitation patterns, socioeconomic factors, and neglected swimming pool density. No models have been developed to provide long-term predictions of how and where weather and environmental factors will combine to produce outbreaks of WNV. A continuing threat to Missourians for WNV resurgence is expected due to the summer weather patterns that can create conditions favorable to WNV activity.

Section A - Communicable Disease Surveillance

West Nile Virus Neuroinvasive Disease-continued

Comparison to National Data: In 2013, the statewide IR was 0.42 cases per 100,000 population (n=25) as compared to the national IR of 0.40 cases per 100,000 population (n=1,267). Nationally the number of reported cases has dropped from the 2,873 cases reported in 2012, but Missouri's case rate continues to increase. In 2012, a large multistate outbreak of WNV illnesses occurred in the U.S., with a focal area of virus activity in Texas and adjacent states, Arizona, Nebraska, and the Dakotas.

The annual IR of WNND in Missouri has remained relatively constant from 2008 to 2011. For those years and 2012, Missouri was at or below the national IR. In 2013 Missouri was slightly above the national IR. The reason for Missouri's steady increase is unknown but may stem from the factors discussed on the previous page. For WNND information by state, see the map, "West Nile Virus Neuroinvasive Disease reported to ArboNet, by State, U.S., 2013" on CDC's website.



The collection of accurate exposure information from the ill persons or their surrogates remains an integral component of public health surveillance. Public health surveillance for human WNV infections is important for monitoring trends, disease burden and clinical presentation. Local public health agencies can use the information to help communities target their prevention and control activities to protect racial, ethnic, age, or geographic groups who may have a higher risk of illness.

Prevention: In the absence of a vaccine, prevention of WNV disease depends on community-level mosquito control programs to reduce vector densities (which may have limited or no funding), personal protective measures to decrease exposure to infected mosquitoes, and screening of blood and organ donors. Personal protective measures include use of mosquito repellents, wearing long-sleeved shirts and long pants, and limiting outdoor exposure from dusk to dawn. Using air conditioning, installing window and door screens, and reducing peridomestic mosquito breeding sites, can further decrease the risk for WNV exposure.

Blood and some organ donations in the U.S. are screened for WNV infection; health care professionals should remain vigilant for the possible transmission of WNV through blood transfusion or organ transplantation. Any suspected WNV infections temporally associated with blood transfusion or organ transplantation should be reported promptly to the appropriate local or state health department.

Section A - Communicable Disease Surveillance

West Nile Virus Neuroinvasive Disease-continued

During an outbreak of WNV disease, prevention activities are directed at minimizing WNV human morbidity and mortality and should focus on mosquito bite prevention through the use of effective insect repellents and mosquito control. Municipal governments should not wait for identification of a human case to begin mosquito control activities. Areas to prioritize for treatment include:

- Locations already recognized as chronic mosquito breeding grounds.
- Locations of increased mosquito activity identified by citizens' complaints.
- Neighborhoods where residents' lifestyles and habits create increased exposure to biting mosquitoes, such as camps of homeless people, popular evening refuges from the heat (e.g., shaded parks), and areas of depressed housing quality where windows and doors are not adequately screened.
- Determining whether a public health emergency exists is best left to local governments, in consultation with their city or county public health agency or vector control program. All local governments should respond as resources allow, without regard to considerations of whether state- or national-level resources might ultimately become available.

For additional information regarding the prevention of WNV disease visit: http://www.cdc.gov/westnile/prevention/index.html.

Additional Website Resources:

CDC Health Topics

CDIRM

Glossary

Abiotic - Pertaining to or characterized by absence of life; incapable of living.

Agent (of Disease) - A factor (e.g. virus, bacterium , parasite, chemical, or radiation) whose presence, excessive presence, or absence of, is essential for the occurrence of disease.

Anamnestic Response - Refers to the immune response of the body to a pathogen it recognizes and produces antibodies specifically against that invading substance.

Bioterrorism - The intentional use of chemical, biological, or radiological agents as weapons during acts of violence or intimidation.

Biotic - Pertaining to or characterized by life or specific life conditions.

Case - A person or animal identified as having a particular disease.

Confirmed Case - surveillance definition, a case usually with positive laboratory results for the disease, generally associated with signs and symptoms of the disease.

Probable Case - surveillance definition, a case usually with a clinically compatible illness that is epidemiologically linked to a confirmed case.

CD - Communicable disease or infectious disease; diseases caused by biological agents such as a virus, bacterium or parasite.

CDC - Centers for Disease Control and Prevention.

CDIRM - Communicable Disease Investigation Reference Manual; Missouri Department of Health and Senior Services.

Cluster - A group of individuals who manifest the same or similar signs and symptoms of disease.

Communicable - Able to spread disease from one person or species to another, either directly or indirectly; contagious.

Disseminated intravascular coagulopathy - Bleeding into the skin.

ELC - Epi Laboratory Capacity Grant.

Endemic - Amount or severity of a disease or infectious agent within a given geographic area or population group.

Epidemiology - The study of how and why diseases and other conditions are distributed within the population the way they are.

Epidemiologist - An investigator who studies the occurrence of disease or other health-related conditions or events in defined populations.

Extended (TB) Contact Investigation - When large numbers of people have been exposed to an infectious TB disease case. A contact investigation identifies, examines and evaluates persons who are at risk of infection with *M. tuberculosis* due to a recent exposure. It is a method of new case finding and allows for early treatment of disease, and early detection and treatment of a new infection.

Fecal-oral - The transmission of an infectious agent by ingestion of feces.

Five-year Median - A data set which includes five consecutive year data totals where half of the elements have a larger value and half of the elements have a lesser value. The median can be thought of as the "middle" of the data.

Glossary

Hospitalized and deaths[¥] - It is unknown whether the disease or condition discussed in this report was directly attributable to the person's hospitalization and/or death. The disease or condition may have been incidental, occurring merely in the presence of the person's hospitalization and/or death.

Incidence - The number of new cases of a disease occurring in a population during a defined time period.

Incidence Rate - The rate at which new events occur in a population. For examples of the calculations, see page 59.

Incubation period - The time between exposure to an infectious agent and appearance of the first sign or symptom of the disease.

Leukopenia - Abnormal decrease of white blood cells usually below 5000/mm^3.

Malaise - A subjective sense of discomfort, weakness, fatigue, or feeling rundown that may occur alone or accompany other symptoms and illnesses.

Mean - Commonly called average, is defined as the sum of the observations divided by the number of observations. For examples of the calculations, see page 59.

Median - The point in a data set where half of the elements have a larger value and half of the elements have a lesser value. The median can be thought of as the "middle" of the data. For examples of the calculations, see page 59.

Morbidity - Having disease, or the proportion of persons in a community with the disease.

Mortality - Refers to death.

Myalgia - Tenderness or pain in the muscles; muscular rheumatism.

National IR - 2013[§] - The 2012 national incidence rates (IR) were used for most diseases/conditions contained in this report [the 2013 national IRs had not been published when this report was originally written].

Neonate - A newborn infant up to one month of age.

Outbreak (or epidemic) - The occurrence in a community or region of an illness(es) similar in nature, clearly in excess of normal expectancy and derived from a common or a propagated source.

Pandemic - An outbreak occurring over a wide geographic area; widespread.

Pathogen - An organism capable of causing disease.

Pathogenic - Capable of causing disease.

PCR - Polymerase Chain Reaction. A laboratory procedure used to identify pathogens through amplification of genetic material.

Peridomestic - Of or pertaining to living in and around human habitations.

PFGE - Pulse Field Gel Electrophoresis. A laboratory procedure of bacterial strain typing.

Polysaccharide capsule - A protective covering made out of sugar molecules that surrounds some bacteria.

Glossary

Pulse-temperature dissociation - Patients have a pulse rate that is substantially slower than would be anticipated based on the degree of fever.

Prevalence - The total number of cases of a disease existing in a given area at any given time.

Preventable TB case:

- A person with a positive TB skin test or TB blood test who is a candidate for treatment and not offered treatment;
- A person with a risk factor(s) for TB who is never offered a TB skin test or TB blood test; and/or
- A secondary TB disease case to a preventable case.

Quartile - Any of three values which divide the sorted data set into four equal parts, so that each part represents 1/4 of the sample or population.

Reactive arthritis - Reactive arthritis is a painful form of inflammatory arthritis that develops in reaction to an infection by bacteria.

Recreational Water - Swimming pools, hot tubs, water parks, water play areas, interactive fountains, lakes, rivers, creeks or oceans.

Rhabdomyolysis - Is the breakdown of muscle tissue that leads to the release of muscle fiber contents into the blood. These substances are harmful to the kidney and often cause kidney damage.

Risk Factors - The presence of any particular factor known to be associated with health related conditions considered important to prevent.

Sequela - A condition following and resulting from a disease.

Serotype - To distinguish organisms on the basis of their constituent antigen(s).

Surveillance (of disease) - An ongoing mechanism to collect, analyze, interpret and distribute information.

Trend - Shows movement consistently in the same direction over a long time.

Thrombocytopenia - An abnormal decrease in the number of platelets.

Vaccine - A suspension of attenuated live or killed microorganisms or fractions thereof, administered to induce immunity and thereby prevent infectious disease.

Vector - A carrier, usually an insect or other arthropod.

Statistical Calculations

Examples of Calculations

Mean

Calculate the **mean** by adding all of the values and dividing the sum by the number of observed values (in this case 11).

55 + 12 + 60 + 46 + 85 + 27 + 39 + 94 + 73 + 5 + 60 = **556**

556 / 11 = **50.54545455**

The **mean** for this data set is **50.5** (result is rounded).

Median

The **median** is the element that falls in the middle of the ordered set. Rank the values from least to most:

39, 60, 73, 85, 55, 27, 12, 94, 60, 46, 5

In this example the **median** is the sixth element in the set, which is **55**.

5, 12, 27, 39, 46, **55**, 60, 60, 73, 85, 94

Incidence rates are calculated with the following equation:

(X divided by Y) multiplied by K

Where:
X is the number of cases for a specified time period
Y is the population (possibly exposed) for the same time period
K is a constant (often 1000 or 100,000) that transforms the result into a uniform quantity allowing comparison with other similar quantities.

Example: The Southwest Region has 86 cases of Hepatitis A in 1993, compared to 63 cases in the Central Region for that year. The 1993 population for the Southwest Region is 694,712, while the population for the Central Region is 621,740.

Southwest Region: **(86 / 694,712) * 100,000 = 12.4**
Central Region: **(63 / 621,740) * 100,000 = 10.1**

A comparison of the two incidence rates shows that in 1993 Southwest Region has a slightly higher incidence of Hepatitis A (12.4 reported cases per 100,000 population) than the Central Region (10.1 reported cases per 100,000 population).

Summary Tables

Case Counts of Selected Communicable Diseases, Confirmed and Probable - Missouri, 15 Year Report															
Disease and/or Condition	**2013**	**2012**	**2011**	**2010**	**2009**	**2008**	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**	**1999**
Animal Rabies	39	28	29	63	65	64	38	66	73	59	43	45	40	50	31
Campylobacteriosis	647	567	919	1054	770	815	722	686	714	745	655	557	628	693	569
Cryptosporidiosis	210	239	495	548	193	195	214	283	246	78	52	41	55	31	26
E coli O157:H7	122	158	122	105	68	76	80	90	75	98	85	70	66	111	47
Ehrlichiosis*	398	228	194	142	167	227	222	99	41	63	40	69	35	67	56
Giardiasis	244	330	344	426	524	468	515	548	522	578	515	512	715	839	807
Haemophilus influenzae	95	82	80	87	63	72	42	39	37	43	42	13	20	23	14
Hepatitis A	9	21	17	30	27	45	24	45	32	34	60	84	88	258	712
Hepatitis B, Acute	61	48	60	67	47	38	40	62	159	187	248	119	130	149	227
Hepatitis C, Acute	6	4	8	6	0	2	5	27	13	4	165	11	9	37	33
Legionellosis	77	69	57	37	65	71	50	22	31	34	37	19	22	26	22
Lyme Disease	3	2	8	5	10	13	10	6	17	26	70	41	37	47	72
Meningococcal Disease	10	16	15	23	27	26	18	15	28	20	49	52	58	67	94
Mumps	8	5	11	10	15	8	12	170	4	3	5	4	4	5	1
Pertussis	559	815	438	604	1015	561	118	308	656	595	208	147	107	97	75
Q Fever	24	3	1	3	3	5	12	11	13	3	3	1	1	0	0
Rocky Mountain Spotted Fever	245	315	270	278	253	407	315	163	128	106	51	96	62	41	16
Salmonellosis	847	1071	900	843	657	764	764	766	801	628	882	830	648	713	758
Shigellosis	89	71	182	1582	1046	227	1276	658	1017	184	356	217	321	671	721
Strep Disease, Group A Invasive	125	129	151	142	94	97	91	91	74	62	81	47	76	63	45
Strep Pneumoniae, Drug Resistant	116	120	105	94	74	93	65	44	37	20	16	5	11	2	0
Tuberculosis Disease	104	89	98	107	80	107	118	104	108	127	110^	136	157	211	208
Tularemia	36	27	21	18	13	21	35	14	27	28	32	16	27	28	19
West Nile Fever	4	3	4	0	0	3	16	12	13	9	30	47	-	-	-
West Nile Encephalitis/Meningitis	25	18	6	3	5	12	61	51	17	27	40	113	-	-	-
Season**	**13-14**	**12-13**	**11-12**	**10-11**	**09-10**	**08-09**	**07-08**	**06-07**	**05-06**	**04-05**	**03-04**	**02-03**	**01-02**	**00-01**	**99-00**
Influenza	23046	37037	20474	17739	30567	11137	30978	14845	12960	10855	17834	4318	4115	1896	3820

*Ehrlichiosis (Beginning in 1999, numbers reflect a total incidence of both HGE and HME, beginning in 2006 also included is Ehrlichiosis, Other or Unspecified)

**Influenza season crosses two calendar years beginning in Week 40 of the first year and ending in Week 20 of the second year.

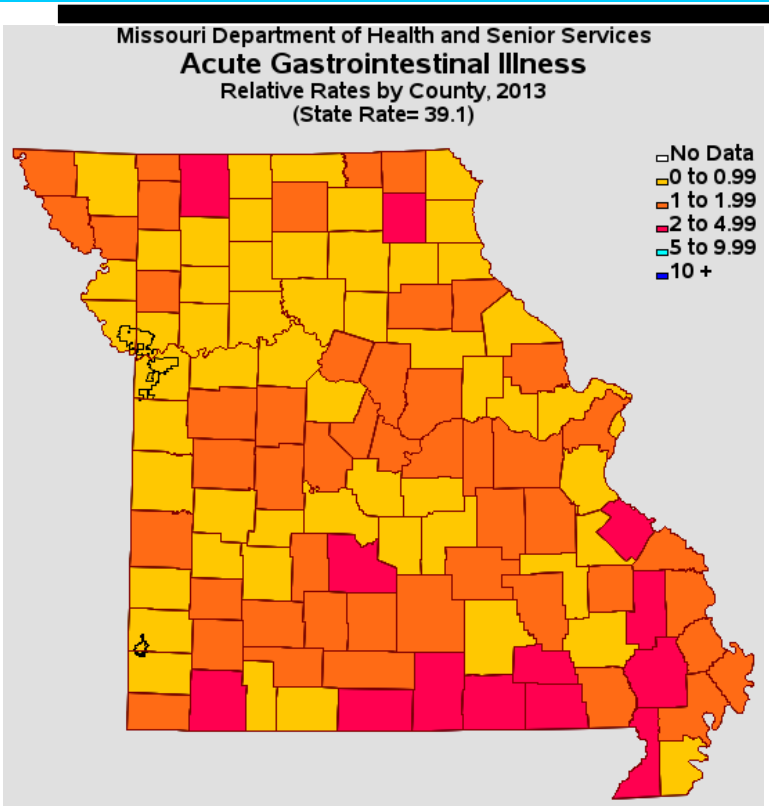
^Tuberculosis Disease incidence officially reported to CDC through National Electronic Telecommunications Surveillance System. Actual incidence was 131 cases.

Summary Tables

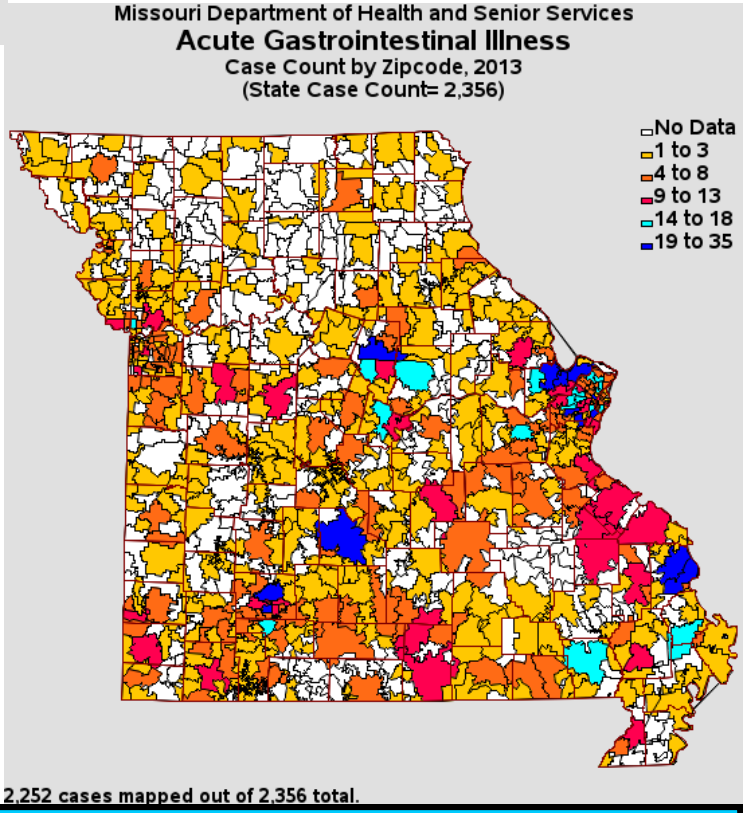
Reported Acute Gastrointestinal Illness Comparative Statistics by Socio-demographic Category, Missouri 2013[1]						
		Case Count	Percent of Total	Rate per 100,000	5-Year Median	Percent Change from Median
Sex	Female	1,206	51.2%	39.3	1,597	-24.5%
	Male	1,147	48.7%	38.9	1,593	-28%
	Unknown	3	0.1%	N/A	2	50%
Race	Black	180	7.6%	24.2	279	-35.5%
	Other	47	2%	28.4	71	-33.8%
	Unknown	474	20.1%	N/A	686	-30.9%
	White	1,655	70.2%	32.4	1,967	-15.9%
Age Group	00 to <01	116	4.9%	153.8	126	-7.9%
	01 to 04	329	14%	108.3	487	-32.4%
	05 to 14	308	13.1%	39.2	476	-35.3%
	15 to 24	272	11.5%	32.7	325	-16.3%
	25 to 39	406	17.2%	35.5	515	-21.2%
	40 to 64	624	26.5%	31.2	685	-8.9%
	65 & older	298	12.6%	33.7	338	-11.8%
	Unknown	3	0.1%	N/A	10	-70%
District	Central	252	10.7%	37.6	331	-23.9%
	Eastern	870	36.9%	38.8	1,031	-15.6%
	Northwest	473	20.1%	30	713	-33.7%
	Southeast	316	13.4%	66.6	333	-5.1%
	Southwest	445	18.9%	42.1	624	-28.7%
	State of Missouri	2,356	100%	39.1	3,191	-26.2%

[1]Socio-demographic Category Information is missing for some cases. N/A=No computation made.
Data Source: Missouri Health Information Surveillance System (WebSurv).

Summary Tables



County relative rates were computed as the county rate per 100,000 divided by the overall state rate per 100,000.



2,252 cases mapped out of 2,356 total.

Summary Tables

Selected Reportable Disease / Condition Case Counts by County, Including the Cities of Independence, Joplin, Kansas City & St. Louis City, Missouri 2013

County or City	Botulism Infant	Brucellosis	Campylobacteriosis	Creutzfeldt-Jakob Disease (CJD)	Cryptosporidiosis	Cyclosporiasis	Dengue Fever	E. Coli Shiga Toxin Positive	E. Coli (All)	E. Coli O157 H7	Ehrlichiosis & Anaplasmosis (All)	Giardiasis	Haemophilus Influenzae, Invasive	Hemolytic Uremic Syndrome	Hepatitis A, Acute	Hepatitis B, Acute	Hepatitis B, Chronic Infection	Hepatitis C, Acute	Hepatitis C, Chronic Infection	Hepatitis E, Acute	Influenza Death < 18 Years	Legionellosis	Leptospirosis	Listeriosis	Lyme Disease	Malaria	Measles	Meningococcal Disease	Mumps	Pertussis	Q Fever, Acute	Q Fever, Chronic	Rabies, Animal	Rabies, Post Exposure Prophylasis	Rocky Mountain Spotted Fever	Salmonellosis	Shigellosis	Strep. Disease, Group A Invasive	Strep. Pneumoniae, Drug-Resistant	Tick-borne Diseases	Tuberculosis	Tularemia	Typhoid Fever	Varicella (Chickenpox)	Vibriosis	West Nile Neuroinvasive & Non-Neuroinvasive Disease	Yersiniosis
Adair	0	0	3	0	0	0	0	1	2	1	2	0	0	0	0	1	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	1	0	4	0	0	0	0	0	0	0
Andrew	0	0	1	0	3	0	0	1	1	0	1	0	0	0	0	0	1	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	2	0	1	0	0	0	1	0
Atchison	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Audrain	0	0	0	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	1	1	0	0	0	0	0	0	0
Barry	0	0	13	0	6	0	0	1	4	3	2	3	0	1	0	0	2	0	25	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	2	10	1	2	3	4	0	0	0	3	0	0	0
Barton	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0	0	0	2	0	0	0	0	0	0	0
Bates	0	0	2	0	0	0	0	0	1	1	2	0	0	0	0	0	1	0	11	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	3	0	0	0	0	0	0	0
Benton	0	0	0	0	2	0	0	0	1	1	3	1	1	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	5	0	0	0	8	0	0	0	1	0	0	0
Bollinger	0	0	7	0	3	0	0	0	0	0	5	5	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	0	0	4	5	4	6	0	1	0	11	0	2	0	2	0	0	0
Boone	0	1	30	1	3	0	1	2	8	6	17	6	3	0	0	3	12	0	130	0	0	4	1	0	0	0	0	1	0	5	1	0	2	15	7	18	2	3	3	24	8	0	0	21	0	0	0
Buchanan	0	0	1	0	6	0	1	1	1	0	3	4	2	0	0	2	10	0	95	0	0	0	0	0	0	0	0	1	0	3	0	0	1	0	0	9	2	0	2	3	0	0	0	0	0	1	0
Butler	0	0	3	0	0	0	0	1	1	0	0	1	0	0	0	0	5	0	92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	19	1	0	1	1	0	0	0	0	0	0	0
Caldwell	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Callaway	0	1	7	0	2	0	0	0	4	4	12	1	0	2	0	0	4	0	26	0	0	0	0	0	0	0	0	0	0	6	0	0	0	3	2	9	0	1	0	15	0	1	0	2	0	1	0
Camden	0	0	6	0	0	0	0	4	4	0	7	4	1	0	0	1	2	0	39	0	1	0	0	0	0	1	0	0	0	1	0	0	0	6	14	2	0	0	0	22	0	1	0	9	0	0	0
Cape Girardeau	0	0	24	0	7	0	0	2	4	2	2	2	1	0	1	2	3	0	57	0	0	0	0	0	0	0	0	0	0	2	0	0	2	4	3	15	2	0	9	5	1	0	0	1	0	0	2
Carroll	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0
Carter	0	0	1	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	4	0	0	0	0	0	0	0
Cass	0	0	19	0	1	0	0	2	2	0	3	2	4	0	0	0	0	0	31	0	0	3	0	0	0	0	0	0	0	8	0	0	0	2	6	11	1	2	3	9	1	0	0	13	0	0	0
Cedar	0	0	2	0	0	0	0	0	0	0	4	0	1	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	2	0	0	1	4	0	0	0	9	0	0	0
Chariton	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	1	0
Christian	0	0	4	0	7	0	0	3	11	8	7	5	2	0	0	1	5	0	41	0	0	0	0	0	0	0	0	0	0	11	0	0	0	13	3	7	0	1	4	11	0	1	0	8	0	0	0
Clark	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Clay	0	0	4	0	7	1	0	1	1	0	6	2	1	1	1	0	5	0	38	0	0	0	0	0	0	0	0	0	0	6	0	0	1	4	6	9	2	1	1	12	0	0	0	15	1	1	0
Clinton	0	0	5	0	1	0	0	0	1	1	2	0	2	0	0	0	1	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	0	0	1	6	1	1	0	1	0	0	0
Cole	0	0	2	0	5	0	0	2	3	1	4	12	0	0	0	0	6	0	72	0	0	0	0	0	0	0	0	0	0	5	0	0	1	7	3	9	2	2	1	7	2	0	0	0	0	0	0
Cooper	0	0	3	0	0	0	0	0	0	0	4	0	1	0	0	1	3	0	9	0	0	1	0	0	0	0	0	0	0	2	0	0	0	2	0	3	0	2	1	4	0	0	0	0	0	0	0
Crawford	0	0	5	0	3	0	0	2	2	0	6	2	2	0	0	1	0	0	21	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	1	2	0	1	1	7	0	0	0	0	0	0	0
Dade	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	1	0	1	0	0	0	0	0
Dallas	0	0	3	0	1	0	0	0	1	1	2	3	0	0	0	1	0	0	16	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	4	0	0	0	0	6	0	0	0	0	0	0	0
Daviess	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Dekalb	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	1	2	0	0	0	0	0	0	0
Dent	0	0	5	0	0	0	0	0	0	0	5	1	0	0	0	0	2	1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	7	0	0	0	1	0	1	0
Douglas	0	0	2	0	1	0	0	0	0	0	2	4	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	3	0	0	1	1	4	1	0	1	1	6	0	0	0	4	0	0	0
Dunklin	0	0	10	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	14	0	0	0	2	0	0	0	0	0	0	1
Franklin	0	0	10	0	3	0	0	1	1	0	1	5	0	0	1	2	1	0	61	0	0	0	0	0	0	0	0	1	0	10	0	0	0	4	1	11	23	0	0	3	0	1	0	1	1	0	0
Gasconade	0	0	1	0	1	0	0	0	0	0	3	1	1	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	6	0	0	0	2	2	3	0	0	0	5	0	0	0	1	0	0	0
Gentry	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Greene	0	0	22	1	16	0	0	13	27	14	20	10	9	2	1	10	28	0	393	0	0	2	0	0	0	0	0	0	1	31	0	0	1	32	21	35	0	11	9	41	3	0	0	0	0	0	0
Grundy	0	0	0	0	0	0	0	3	3	0	2	0	0	0	0	2	0	0	5	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	3	0	0	0	5	0	0	0
Harrison	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	1	0	0	0	0	0	0	0
Henry	0	0	2	0	1	0	0	0	1	1	2	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	6	0	0	0	5	0	0	0	0	0	0	0
Hickory	0	0	1	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	9	0	0	0	1	0	0	0
Holt	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
Howard	0	0	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	2	0	0	0	0	0	0	0
Howell	0	0	13	1	0	0	0	1	10	9	12	0	0	1	0	0	0	0	54	0	0	1	0	0	0	0	0	0	0	10	0	0	4	7	6	6	1	3	2	22	0	4	0	1	0	0	1
Independence	0	0	7	1	4	0	0	2	2	0	4	2	3	0	1	2	7	1	35	0	0	6	0	0	0	0	0	0	0	6	0	0	0	0	2	14	2	1	7	7	0	1	1	17	0	0	0
Iron	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0
Jackson	0	0	9	2	6	1	0	4	8	4	13	7	5	0	0	2	13	0	107	0	0	4	0	0	0	0	0	0	0	20	0	0	0	2	6	36	0	7	11	19	6	0	0	6	0	0	0
Jasper	0	0	5	0	10	0	0	1	2	1	13	4	0	0	0	2	2	0	77	0	0	2	0	0	1	0	0	0	0	4	0	0	0	0	2	4	0	0	0	19	1	3	0	11	0	0	0
Jefferson	0	0	10	0	1	0	0	6	11	5	14	8	2	0	0	0	9	0	145	0	0	3	0	0	0	0	0	1	0	26	0	0	0	7	3	25	1	6	0	17	1	0	0	5	0	2	0
Johnson	0	0	4	0	4	0	0	5	6	1	2	1	0	0	1	0	2	0	11	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	10	9	0	1	0	13	3	1	0	15	0	0	0
Joplin	0	0	3	0	1	0	0	2	3	1	2	3	0	0	0	0	6	0	46	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	2	0	0	0	4	0	0	0
Kansas City	0	0	16	0	20	1	0	6	8	2	14	15	8	0	2	1	55	0	376	0	0	10	0	0	0	2	0	2	0	70	0	0	0	33	5	48	10	21	12	19	18	0	0	0	1	4	1
Knox	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0
Laclede	0	0	15	0	1	0	0	2	2	0	7	3	0	0	0	0	1	0	33	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	4	14	1	3	2	12	0	1	0	0	0	1	0
Lafayette	0	0	5	0	1	0	0	0	1	1	1	0	0	0	0	1	0	0	15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	1	1	2	0	0	0	3	0	1	0
Lawrence	0	0	4	0	6	0	0	5	8	3	5	0	0	1	0	1	0	0	25	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	3	3	0	2	1	8	1	0	0	5	0	1	0
Lewis	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	11	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
Lincoln	0	0	3	0	1	0	0	5	6	1	4	3	0	0	0	0	1	0	36	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	2	11	1	2	1	6	0	0	0	0	0	0	0
Linn	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0	2	0	0	0
Livingston	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	1	0	0	0	0	0	0	0
Macon	0	0	1	1	0	0	0	0	1	1	3	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	1	0	0	0	4	0	0	0	0	0	0	0
Madison	0	0	3	0	4	0	0	0	0	0	3	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3	0	1	0	1	0	3	0	0	0	0	0	0	1
Maries	0	0	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	1	6	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	1	0	0	0	12	0	0	0	0	0	0	0
Marion	0	0	0	0	0	0	0	1	1	0	0	3	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	6	0	0	0	5	0	2	0	2	0	0	1	0	0	0	0	0	0
Mcdonald	0	0	5	0	2	0	0	1	1	0	2	0	0	0	0	1	4	1	27	0	0	1	0	0	0	0	0	1	0	5	0	0	0	0	1	7	0	0	0	3	0	0	0	1	0	0	0
Mercer	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miller	0	0	1	1	1	1	0	2	2	0	3	1	1	0	0	0	1	0	17	0	0	1	0	0	0	0	0	0	0	0	0	0	0	7	4	3	0	1	0	7	0	0	0	1	0	0	0
Mississippi	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	34	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Moniteau	0	0	3	0	0	0	0	1	1	0	1	2	0	0	0	0	1	0	7	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	3	0	0	0	1	0	0	0	0	0	0	0
Monroe	0	0	4	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	4	0	0	0	3	0	0	0
Montgomery	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	3	0	0	0
Morgan	0	0	1	0	0	0	0	0	0	0	7	0	0	0	0	0	1	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	7	0	0	0	0	0	0	0
New Madrid	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	1	0	0	0	0	0	1
Newton	0	0	1	0	4	0	0	3	4	1	14	3	0	0	0	1	1	0	33	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	4	0	0	1	18	0	3	0	2	0	0	0
Nodaway	0	0	2	0	0	0	0	1	1	0	1	2	0	0	0	0	1	0	13	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0
Oregon	0	0	2	0	0	0	0	1	1	0	6	4	1	0	0	0	2	0	6	0	0	1	0	0	0	0	0	0	0	5	0	0	4	15	6	2	0	0	0	13	0	1	0	0	0	0	0
Osage	0	0	0	0	0	0	0	0	1	1	1	2	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	3	0	0	0	2	0	0	0	0	0	0	0
Ozark	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	2	0	0	3	1	5	8	0	0	0	6	0	0	0	1	0	0	0
Pemiscot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1
Perry	0	0	4	0	3	0	0	3	4	1	2	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3	0	0	1	4	1	0	0	1	0	0	0
Pettis	0	0	4	0	4	0	0	0	1	1	2	1	1	0	0	1	5	0	32	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	3	9	1	0	0	5	0	0	0	1	0	0	0
Phelps	0	0	11	0	0	0	0	0	0	0	5	1	1	0	0	1	2	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	5	5	0	1	0	11	1	1	0	2	0	0	0
Pike	0	0	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0	0	0	2	0	0	0	4	0	0	0
Platte	0	0	1	0	1	0	0	0	0	0	0	3	0	0	0	1	4	0	14	0	0	0	0	1	1	0	0	0	1	6	0	0	0	0	1	9	0	0	0	3	0	1	0	1	0	0	1
Polk	0	0	1	0	3	0	0	0	0	0	7	1	1	0	0	0	2	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	2	0	1	0	9	1	1	0	2	0	0	0
Pulaski	0	0	2	0	0	0	0	0	0	0	3	2	0	0	0	0	7	0	31	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	5	5	0	0	0	8	0	0	0	1	0	0	0
Putnam	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1	0	0	0	1	0	0	0
Ralls	0	0	0	0	0	0	0	1	3	2	2	1	1	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	2	0	0	0	1	0	0	0
Randolph	0	0	2	0	0	0	0	1	2	1	3	0	1	0	0	0	3	0	8	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	3	0	0	0	5	0	0	0	0	0	1	0
Ray	0	0	2	0	0	0	0	2	2	0	0	0	2	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	1	0
Reynolds	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	0	0	0	1	0	0	0
Ripley	0	0	2	0	0	0	0	1	1	0	4	0	0	0	0	1	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	8	0	1	0	5	0	1	0	0	0	0	0
Saline	0	0	2	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	9	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	4	0	0	0	0	1	0
Schuyler	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Scotland	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Scott	0	0	11	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	11	0	0	1	2	1	0	0	1	0	0	0
Shannon	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Shelby	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0
St Charles	0	0	44	1	9	0	0	8	18	10	12	12	4	2	0	2	10	1	155	0	0	4	1	0	0	1	0	0	0	43	0	0	1	11	6	55	3	7	3	18	0	0	0	3	1	1	0
St Clair	0	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	3	1	0	0	0	0	0	0
St Francois	0	0	6	0	3	0	0	2	2	0	8	3	0	0	0	0	8	0	163	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2	0	4	0	1	1	8	3	0	0	0	0	0	0
St Louis	1	0	128	2	21	0	2	27	38	11	19	43	19	1	1	11	70	0	573	0	0	14	0	0	1	1	0	0	0	168	0	1	5	98	5	161	25	21	12	26	25	1	0	9	1	7	1
St Louis City	0	0	21	0	4	0	1	4	11	7	3	17	6	0	0	2	53	0	774	1	0	6	0	0	0	1	1	2	0	16	0	0	1	5	2	38	2	9	7	5	16	0	0	8	0	2	2
Ste Genevieve	0	0	6	0	2	0	0	1	3	2	5	1	0	0	0	0	1	0	9	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	7	1	0	0	9	0	1	0	3	0	1	0
Stoddard	0	0	14	0	0	0	0	2	2	0	3	3	0	0	0	0	0	0	31	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	4	3	2	0	3	7	0	0	0	2	0	0	0
Stone	0	0	0	0	0	0	0	0	1	1	2	3	1	0	0	1	1	0	20	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6	1	5	0	0	0	3	0	0	0	1	0	0	0
Sullivan	0	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	1	0	0	0	0	1	0	0	0	1	0	0	0
Taney	0	0	0	0	0	1	0	2	3	1	5	0	0	0	0	0	2	0	64	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	8	4	1	0	2	14	0	1	0	0	0	0	0
Texas	0	0	8	0	1	0	0	0	0	0	3	2	1	0	0	1	4	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	4	3	0	1	0	9	0	2	0	0	0	0	0
Vernon	0	0	7	0	1	0	0	2	4	2	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	0	0	0	1	0	0	0	2	0	0	0
Warren	0	0	2	1	0	0	0	0	2	2	3	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0
Washington	0	0	4	0	1	0	0	0	2	2	0	0	0	0	0	0	3	0	32	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	1	7	0	1	0	1	0	0	0	0	0	0	0
Wayne	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7	1	2	0	0	1	5	0	0	0	0	0	0	0
Webster	0	0	6	0	4	0	0	3	5	2	8	1	1	2	0	0	3	0	29	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	2	2	0	0	0	12	0	2	0	0	0	0	0
Worth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Wright	0	0	3	0	0	0	0	2	2	0	0	1	0	0	0	0	1	0	12	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0	0	0

Data Source: Missouri Health Information Surveillance System (WebSurv).

Summary Tables

Select Reportable Disease Case Counts and Rates Per 100,000 Population By Gender, Missouri 2013

Disease and/or Condition	Female		Male		Unknown		Total	
	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000
Campylobacteriosis	291	9.5	353	12	3	N/A	647	10.7
Creutzfeldt-Jakob Disease (CJD)	6	0.2	7	0.2	0	N/A	13	0.2
Cryptosporidiosis	103	3.4	107	3.6	0	N/A	210	3.5
Cyclosporiasis	2	0.1	3	0.1	0	N/A	5	0.1
Dengue Fever	2	0.1	3	0.1	0	N/A	5	0.1
E Coli Shiga Toxin Positive	84	2.7	70	2.4	0	N/A	154	2.6
E. Coli (All)	147	4.8	129	4.4	0	N/A	276	4.6
E. Coli O157 H7	63	2.1	59	2	0	N/A	122	2
Ehrlichiosis & Anaplasmosis (All)	147	4.8	251	8.5	0	N/A	398	6.6
Giardiasis	107	3.5	137	4.6	0	N/A	244	4.1
Haemophilus Influenzae, Invasive	62	2	33	1.1	0	N/A	95	1.6
Hemolytic Uremic Syndrome	6	0.2	7	0.2	0	N/A	13	0.2
Hepatitis A Acute	4	0.1	5	0.2	0	N/A	9	0.1
Hepatitis B Acute	26	0.8	35	1.2	0	N/A	61	1
Hepatitis B Chronic Infection	153	5	238	8.1	0	N/A	391	6.5
Hepatitis C Acute	2	0.1	4	0.1	0	N/A	6	0.1
Hepatitis C, Chronic Infection	1,923	62.6	2,950	100	2	N/A	4,875	81
Hepatitis E Acute	1	0	0	0	0	N/A	1	0
Influenza Death < 18 Years	1	0	0	0	0	N/A	1	0
Legionellosis	33	1.1	44	1.5	0	N/A	77	1.3
Leptospirosis	0	0	2	0.1	0	N/A	2	0
Listeriosis	1	0	1	0	0	N/A	2	0
Lyme	2	0.1	1	0	0	N/A	3	0
Malaria	2	0.1	4	0.1	0	N/A	6	0.1
Measles	2	0.1	1	0	0	N/A	3	0
Meningococcal Disease	7	0.2	3	0.1	0	N/A	10	0.2
Mumps	7	0.2	1	0	0	N/A	8	0.1
Pertussis	281	9.2	278	9.4	0	N/A	559	9.3
Q Fever (All)	3	0.1	21	0.7	0	N/A	24	0.4
Rabies Post Exposure Prophylaxis	195	6.3	183	6.2	0	N/A	378	6.3
Rocky Mountain Spotted Fever	60	2	185	6.3	0	N/A	245	4.1
Salmonellosis	483	15.7	364	12.3	0	N/A	847	14.1
Shigellosis	52	1.7	37	1.3	0	N/A	89	1.5
Strep Disease, Group A Invasive	59	1.9	66	2.2	0	N/A	125	2.1
Strep Pneumoniae, Drug-Resistant	58	1.9	58	2	0	N/A	116	1.9
Tick-borne Diseases	224	7.3	458	15.5	0	N/A	682	11.3
Tuberculosis	41	1.3	63	2.1	0	N/A	104	1.7
Tularemia	15	0.5	21	0.7	0	N/A	36	0.6
Typhoid Fever	0	0	1	0	0	N/A	1	0
Varicella (Chickenpox)	110	3.6	119	4	0	N/A	229	3.8
Vibriosis	2	0.1	3	0.1	0	N/A	5	0.1
West Nile Fever	1	0	3	0.1	0	N/A	4	0.1
West Nile Virus Neuroinvasive Disease	12	0.4	13	0.4	0	N/A	25	0.4
Yersiniosis	10	0.3	2	0.1	0	N/A	12	0.2

N/A = No computation made. Data Source: Missouri Health Information Surveillance System (WebSurv).

Summary Tables

Select Reportable Disease Case Counts and Rates Per 100,000 Population By Race, Missouri 2013

Disease and/or Condition	Black		White		Unknown		Other		Total	
	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000
Campylobacteriosis	31	4.2	474	9.3	136	N/A	6	3.6	647	10.7
Creutzfeldt-Jakob Disease (CJD)	0	0	12	0.2	1	N/A	0	0	13	0.2
Cryptosporidiosis	14	1.9	167	3.3	24	N/A	5	3	210	3.5
Cyclosporiasis	0	0	5	0.1	0	N/A	0	0	5	0.1
Dengue Fever	0	0	1	0	3	N/A	1	0.6	5	0.1
E Coli Shiga Toxin Positive	4	0.5	115	2.2	32	N/A	3	1.8	154	2.6
E. Coli (All)	8	1.1	216	4.2	48	N/A	4	2.4	276	4.6
E. Coli O157 H7	4	0.5	101	2	16	N/A	1	0.6	122	2
Ehrlichiosis & Anaplasmosis (All)	1	0.1	346	6.8	51	N/A	0	0	398	6.6
Giardiasis	19	2.6	156	3.1	65	N/A	4	2.4	244	4.1
Haemophilus Influenzae, Invasive	13	1.7	53	1	27	N/A	2	1.2	95	1.6
Hemolytic Uremic Syndrome	0	0	11	0.2	2	N/A	0	0	13	0.2
Hepatitis A Acute	0	0	7	0.1	1	N/A	1	0.6	9	0.1
Hepatitis B Acute	8	1.1	45	0.9	7	N/A	1	0.6	61	1
Hepatitis B Chronic Infection	70	9.4	117	2.3	142	N/A	62	37.5	391	6.5
Hepatitis C Acute	0	0	5	0.1	1	N/A	0	0	6	0.1
Hepatitis C, Chronic Infection	460	61.8	1,795	35.1	2,587	N/A	33	20	4,875	81
Hepatitis E Acute	0	0	0	0	1	N/A	0	0	1	0
Influenza Death < 18 Years	0	0	1	0	0	N/A	0	0	1	0
Legionellosis	22	3	48	0.9	7	N/A	0	0	77	1.3
Leptospirosis	0	0	0	0	2	N/A	0	0	2	0
Listeriosis	0	0	1	0	1	N/A	0	0	2	0
Lyme	0	0	3	0.1	0	N/A	0	0	3	0
Malaria	3	0.4	2	0	0	N/A	1	0.6	6	0.1
Measles	0	0	2	0	0	N/A	1	0.6	3	0
Meningococcal Disease	3	0.4	5	0.1	2	N/A	0	0	10	0.2
Mumps	0	0	6	0.1	2	N/A	0	0	8	0.1
Pertussis	59	7.9	416	8.1	69	N/A	15	9.1	559	9.3
Q Fever (All)	0	0	22	0.4	1	N/A	1	0.6	24	0.4
Rabies Post Exposure Prophylaxis	17	2.3	275	5.4	83	N/A	3	1.8	378	6.3
Rocky Mountain Spotted Fever	1	0.1	223	4.4	20	N/A	1	0.6	245	4.1
Salmonellosis	95	12.8	550	10.8	179	N/A	23	13.9	847	14.1
Shigellosis	9	1.2	60	1.2	17	N/A	3	1.8	89	1.5
Strep Disease, Group A Invasive	22	3	80	1.6	22	N/A	1	0.6	125	2.1
Strep Pneumoniae, Drug-Resistant	21	2.8	87	1.7	7	N/A	1	0.6	116	1.9
Tick-borne Diseases	3	0.4	603	11.8	75	N/A	1	0.6	682	11.3
Tuberculosis	27	3.6	41	0.8	0	N/A	36	21.8	104	1.7
Tularemia	1	0.1	31	0.6	4	N/A	0	0	36	0.6
Typhoid Fever	1	0.1	0	0	0	N/A	0	0	1	0
Varicella (Chickenpox)	11	1.5	186	3.6	26	N/A	6	3.6	229	3.8
Vibriosis	0	0	3	0.1	1	N/A	1	0.6	5	0.1
West Nile Fever	1	0.1	2	0	1	N/A	0	0	4	0.1
West Nile Virus Neuroinvasive Disease	3	0.4	16	0.3	6	N/A	0	0	25	0.4
Yersiniosis	3	0.4	7	0.1	1	N/A	1	0.6	12	0.2

N/A = No computation made. Data Source: Missouri Health Information Surveillance System (WebSurv).

Summary Tables

Select Reportable Disease Case Counts and Rates Per 100,000 Population by Select Age Groups, Missouri 2013

Disease and/or Condition	00 to <01		01 to 04		05 to 14		15 to 24		25 to 39		40 to 64		65 & Older		Unknown		Total	
	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000
Campylobacteriosis	26	34.5	66	21.7	52	6.6	74	8.9	114	10	222	11.1	92	10.4	1	N/A	647	10.7
Creutzfeldt-Jakob Disease (CJD)	0	0	0	0	0	0	0	0	1	0.1	5	0.3	7	0.8	0	N/A	13	0.2
Cryptosporidiosis	3	4	29	9.5	19	2.4	30	3.6	51	4.5	54	2.7	23	2.6	1	N/A	210	3.5
Cyclosporiasis	0	0	1	0.3	0	0	0	0	0	0	3	0.2	1	0.1	0	N/A	5	0.1
Dengue Fever	0	0	0	0	0	0	0	0	3	0.3	1	0.1	1	0.1	0	N/A	5	0.1
E Coli Shiga Toxin Positive	4	5.3	36	11.8	24	3.1	31	3.7	25	2.2	23	1.2	11	1.2	0	N/A	154	2.6
E. Coli (All)	7	9.3	63	20.7	61	7.8	48	5.8	39	3.4	37	1.9	21	2.4	0	N/A	276	4.6
E. Coli O157 H7	3	4	27	8.9	37	4.7	17	2	14	1.2	14	0.7	10	1.1	0	N/A	122	2
Ehrlichiosis & Anaplasmosis (All)	0	0	9	3	13	1.7	20	2.4	39	3.4	186	9.3	131	14.8	0	N/A	398	6.6
Giardiasis	4	5.3	40	13.2	25	3.2	27	3.2	51	4.5	72	3.6	24	2.7	1	N/A	244	4.1
Haemophilus Influenzae, Invasive	5	6.6	4	1.3	7	0.9	2	0.2	2	0.2	27	1.4	48	5.4	0	N/A	95	1.6
Hemolytic Uremic Syndrome	0	0	5	1.6	4	0.5	1	0.1	1	0.1	0	0	2	0.2	0	N/A	13	0.2
Hepatitis A Acute	0	0	0	0	0	0	3	0.4	2	0.2	3	0.2	1	0.1	0	N/A	9	0.1
Hepatitis B Acute	0	0	0	0	0	0	3	0.4	24	2.1	27	1.4	7	0.8	0	N/A	61	1
Hepatitis B Chronic Infection	0	0	2	0.7	5	0.6	25	3	127	11.1	195	9.8	37	4.2	0	N/A	391	6.5
Hepatitis C Acute	0	0	0	0	0	0	1	0.1	2	0.2	1	0.1	2	0.2	0	N/A	6	0.1
Hepatitis C, Chronic Infection	4	5.3	6	2	6	0.8	400	48.1	1,196	104.6	2,946	147.4	310	35.1	7	N/A	4,875	81
Hepatitis E Acute	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	N/A	1	0
Influenza Death < 18 Years	1	1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	N/A	1	0
Legionellosis	0	0	0	0	0	0	1	0.1	5	0.4	40	2	31	3.5	0	N/A	77	1.3
Leptospirosis	0	0	0	0	0	0	0	0	1	0.1	1	0.1	0	0	0	N/A	2	0
Listeriosis	0	0	0	0	0	0	0	0	1	0.1	1	0.1	0	0	0	N/A	2	0
Lyme	0	0	1	0.3	0	0	0	0	1	0.1	1	0.1	0	0	0	N/A	3	0
Malaria	0	0	0	0	1	0.1	1	0.1	1	0.1	2	0.1	1	0.1	0	N/A	6	0.1
Measles	0	0	2	0.7	0	0	0	0	1	0.1	0	0	0	0	0	N/A	3	0
Meningococcal Disease	1	1.3	0	0	0	0	0	0	2	0.2	2	0.1	5	0.6	0	N/A	10	0.2
Mumps	0	0	0	0	4	0.5	0	0	2	0.2	2	0.1	0	0	0	N/A	8	0.1
Pertussis	82	108.8	77	25.3	219	27.9	73	8.8	37	3.2	54	2.7	16	1.8	1	N/A	559	9.3
Q Fever (All)	0	0	0	0	1	0.1	3	0.4	6	0.5	11	0.6	3	0.3	0	N/A	24	0.4
Rabies Post Exposure Prophylaxis	2	2.7	29	9.5	71	9	51	6.1	77	6.7	116	5.8	31	3.5	1	N/A	378	6.3
Rocky Mountain Spotted Fever	0	0	3	1	7	0.9	17	2	35	3.1	125	6.3	58	6.6	0	N/A	245	4.1
Salmonellosis	71	94.2	111	36.5	110	14	81	9.7	126	11	217	10.9	131	14.8	0	N/A	847	14.1
Shigellosis	0	0	13	4.3	36	4.6	8	1	19	1.7	11	0.6	2	0.2	0	N/A	89	1.5
Strep Disease, Group A Invasive	2	2.7	3	1	8	1	9	1.1	12	1	47	2.4	44	5	0	N/A	125	2.1
Strep Pneumoniae, Drug-Resistant	0	0	2	0.7	2	0.3	1	0.1	8	0.7	51	2.6	52	5.9	0	N/A	116	1.9
Tick-borne Diseases	0	0	17	5.6	23	2.9	38	4.6	78	6.8	332	16.6	193	21.9	1	N/A	682	11.3
Tuberculosis	0	0	7	2.3	0	0	9	1.1	18	1.6	43	2.2	27	3.1	0	N/A	104	1.7
Tularemia	0	0	4	1.3	3	0.4	1	0.1	3	0.3	20	1	4	0.5	1	N/A	36	0.6
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	N/A	1	0
Varicella (Chickenpox)	8	10.6	44	14.5	127	16.2	28	3.4	11	1	10	0.5	1	0.1	0	N/A	229	3.8
Vibriosis	0	0	0	0	0	0	0	0	2	0.2	2	0.1	1	0.1	0	N/A	5	0.1
West Nile Fever	0	0	1	0.3	0	0	0	0	0	0	3	0.2	0	0	0	N/A	4	0.1
West Nile Virus Neuroinvasive Disease	0	0	0	0	0	0	2	0.2	4	0.3	10	0.5	9	1	0	N/A	25	0.4
Yersiniosis	4	5.3	1	0.3	1	0.1	0	0	2	0.2	3	0.2	1	0.1	0	N/A	12	0.2

N/A = No computation made. Data Source: Missouri Health Information Surveillance System

Summary Tables

Select Reportable Disease Case Counts By Event Month, Missouri 2013

Disease and/or Condition	January	February	March	April	May	June	July	August	September	October	November	December
Botulism Infant	0	0	1	0	0	0	0	0	0	0	0	0
Campylobacteriosis	41	35	44	43	60	80	98	59	45	71	32	39
Creutzfeldt-Jakob Disease (CJD)	1	0	1	3	0	0	2	2	3	0	1	0
Cryptosporidiosis	19	14	10	7	14	11	24	35	26	26	14	10
Cyclosporiasis	0	0	0	0	0	0	3	2	0	0	0	0
Dengue Fever	0	0	0	0	0	0	0	1	2	0	1	1
E Coli Shiga Toxin Positive	9	3	4	4	23	15	24	26	14	18	8	6
E. Coli O157 H7	12	1	4	2	20	26	15	17	10	11	1	3
Ehrlichiosis & Anaplasmosis (All)	0	0	0	0	22	86	171	58	41	15	1	4
Giardiasis	22	16	8	16	24	13	29	30	30	31	10	15
Haemophilus Influenzae, Invasive	11	7	5	13	8	11	10	10	6	6	4	4
Hemolytic Uremic Syndrome	2	0	0	0	1	3	3	2	0	1	1	0
Hepatitis A Acute	0	0	1	0	0	0	1	1	3	1	1	1
Hepatitis B Acute	1	2	2	7	6	5	2	8	4	10	7	7
Hepatitis B Chronic Infection	33	29	38	24	41	26	29	28	39	45	29	30
Hepatitis C Acute	0	0	0	0	0	0	0	1	2	0	1	2
Hepatitis C, Chronic Infection	412	338	398	373	506	355	456	384	354	526	383	381
Hepatitis E Acute	0	0	0	0	0	0	0	0	1	0	0	0
Influenza Death < 18 Years	0	1	0	0	0	0	0	0	0	0	0	0
Legionellosis	4	2	2	1	6	19	9	11	6	6	5	6
Leptospirosis	0	0	1	0	1	0	0	0	0	0	0	0
Listeriosis	0	0	0	1	0	0	0	1	0	0	0	0
Lyme	0	0	0	0	0	0	1	1	0	1	0	0
Malaria	1	0	0	0	0	0	0	3	1	0	0	1
Measles	0	0	0	0	0	1	2	0	0	0	0	0
Meningococcal Disease	3	0	0	2	0	1	0	0	3	1	0	0
Mumps	0	0	0	1	0	1	1	2	0	3	0	0
Pertussis	39	27	32	41	30	23	26	54	50	96	88	53
Q Fever,Acute	0	0	0	0	0	1	0	3	5	3	0	10
Q Fever,Chronic	0	0	1	0	0	0	0	1	0	0	0	0
Rabies Post Exposure Prophylaxis	17	17	16	23	33	43	56	66	36	35	16	20
Rocky Mountain Spotted Fever	0	4	1	2	29	58	68	25	29	19	9	1
Salmonellosis	58	35	33	57	80	88	125	87	110	92	37	45
Shigellosis	3	0	6	6	1	6	7	7	17	18	8	10
Strep Disease, Group A Invasive	15	13	9	14	15	6	12	7	5	10	4	15
Strep Pneumoniae, Drug-Resistant	24	13	8	13	9	4	6	6	6	9	4	14
Tick-borne Diseases	0	4	1	4	55	157	247	87	74	37	11	5
Tuberculosis	7	7	4	7	14	3	13	9	8	12	11	9
Tularemia	0	0	0	2	4	13	7	3	4	2	1	0
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	1	0
Varicella (Chickenpox)	26	16	26	18	5	5	12	30	29	26	19	17
Vibriosis	0	1	0	0	0	0	1	0	0	3	0	0
West Nile Fever and Neuroinvasive Disease	0	0	0	0	0	0	0	1	13	14	1	0
Yersiniosis	0	1	1	0	2	4	1	1	0	0	1	1

Data Source: Missouri Health Information Surveillance System (WebSurv).

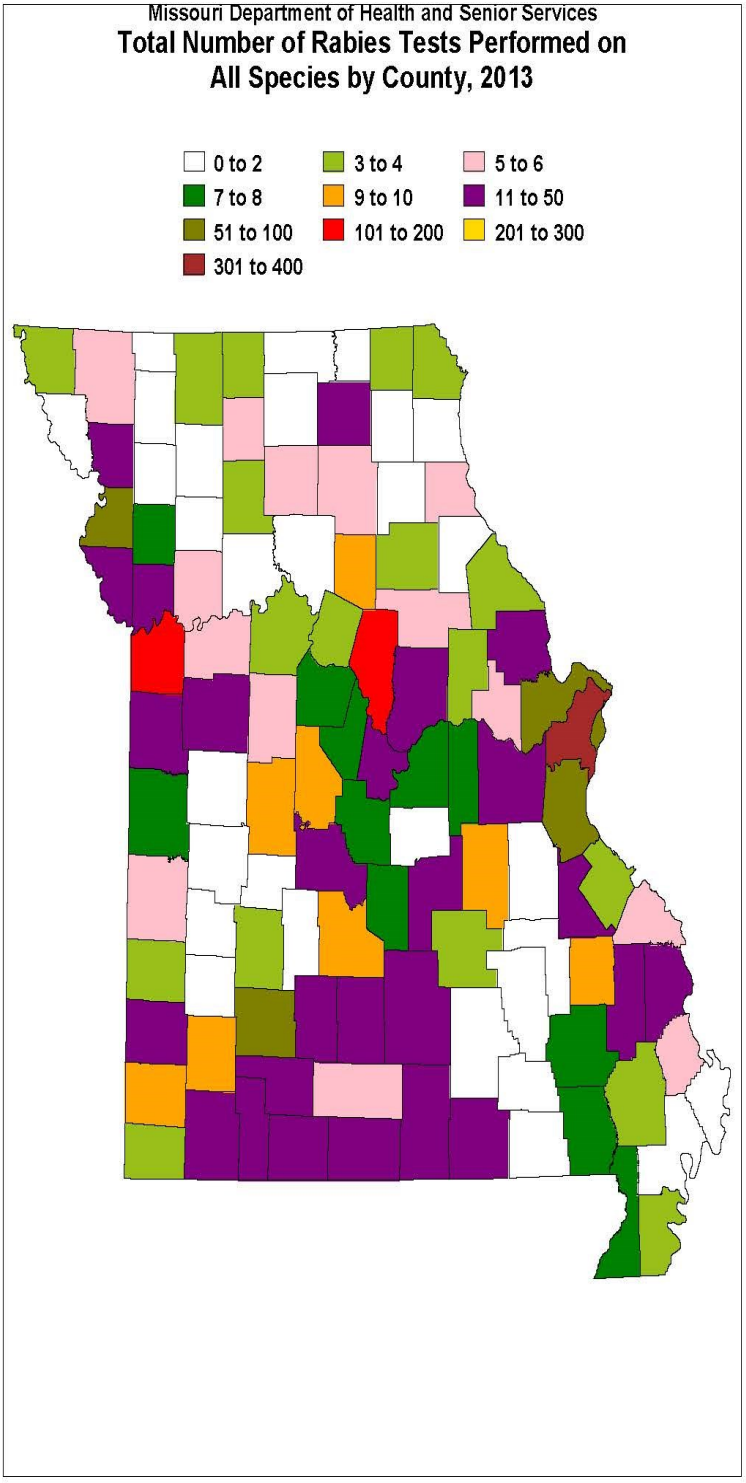
Summary Tables

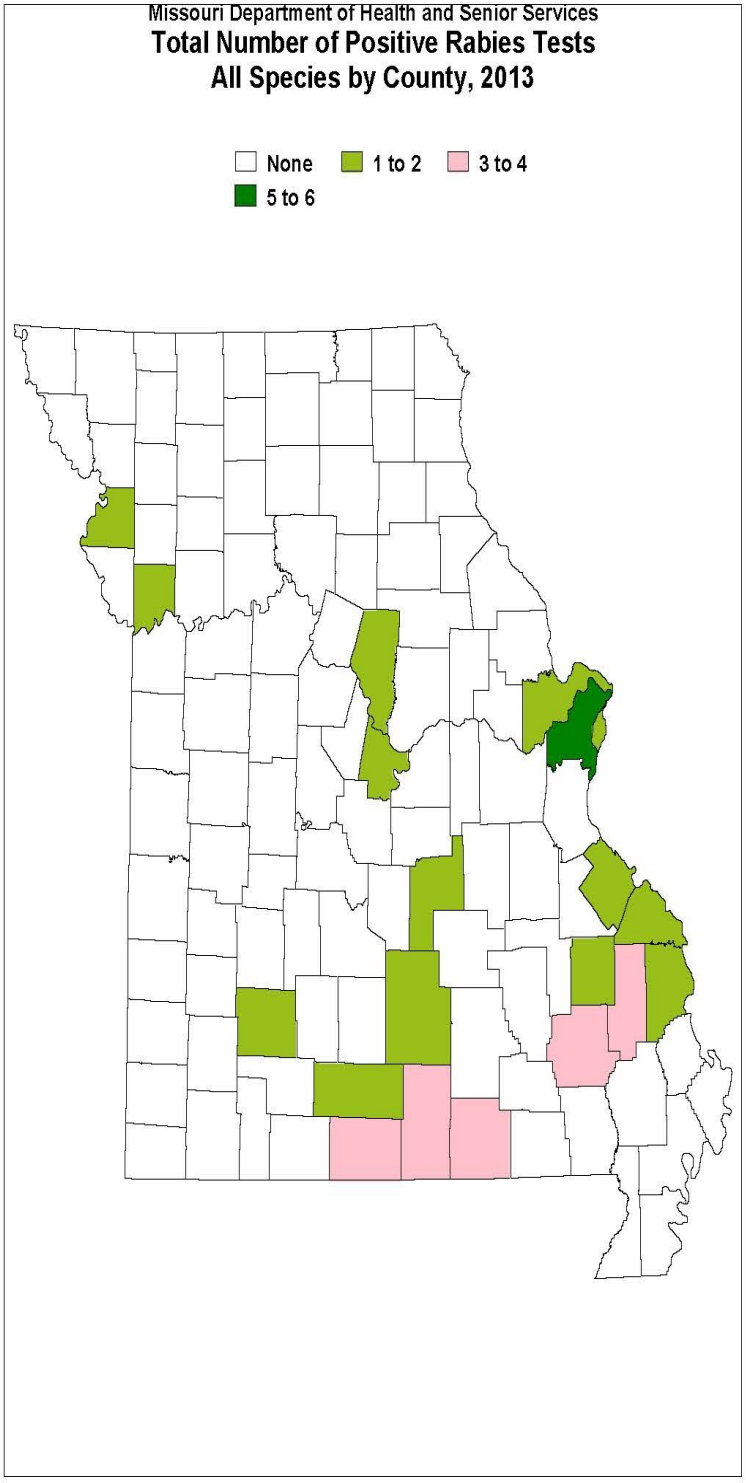
Select Reportable Disease Case Counts and Rates Per 100,000 Population by Health Districts, Missouri 2013

Condition and/or Disease	Central		Eastern		Northwest		Southeast		Southwest		State of Missouri	
	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000	Case Count	Rate per 100,000
Campylobacteriosis	78	11.6	241	10.8	93	5.9	118	24.9	117	11.1	647	10.7
Creutzfeldt-Jakob Disease (CJD)	4	0.6	4	0.2	3	0.2	1	0.2	1	0.1	13	0.2
Cryptosporidiosis	13	1.9	48	2.1	66	4.2	18	3.8	65	6.2	210	3.5
Cyclosporiasis	1	0.1	0	0	3	0.2	0	0	1	0.1	5	0.1
Dengue Fever	1	0.1	3	0.1	1	0.1	0	0	0	0	5	0.1
E Coli Shiga Toxin Positive	16	2.4	57	2.5	30	1.9	10	2.1	41	3.9	154	2.6
E. Coli (All)	33	4.9	98	4.4	45	2.9	21	4.4	79	7.5	276	4.6
E. Coli O157 H7	17	2.5	41	1.8	15	1	11	2.3	38	3.6	122	2
Ehrlichiosis & Anaplasmosis (All)	76	11.3	73	3.3	64	4.1	51	10.7	134	12.7	398	6.6
Giardiasis	37	5.5	92	4.1	41	2.6	26	5.5	48	4.5	244	4.1
Haemophilus Influenzae, Invasive	12	1.8	31	1.4	30	1.9	3	0.6	19	1.8	95	1.6
Hemolytic Uremic Syndrome	2	0.3	3	0.1	1	0.1	1	0.2	6	0.6	13	0.2
Hepatitis A Acute	0	0	2	0.1	5	0.3	1	0.2	1	0.1	9	0.1
Hepatitis B Acute	7	1	17	0.8	13	0.8	4	0.8	20	1.9	61	1
Hepatitis B Chronic Infection	36	5.4	156	7	112	7.1	18	3.8	69	6.5	391	6.5
Hepatitis C Acute	0	0	2	0.1	1	0.1	0	0	3	0.3	6	0.1
Hepatitis C, Chronic Infection	442	65.9	1,999	89.2	911	57.7	504	106.1	1,019	96.4	4,875	81
Hepatitis E Acute	0	0	1	0	0	0	0	0	0	0	1	0
Influenza Death < 18 Years	1	0.1	0	0	0	0	0	0	0	0	1	0
Legionellosis	9	1.3	29	1.3	27	1.7	3	0.6	9	0.9	77	1.3
Leptospirosis	1	0.1	1	0	0	0	0	0	0	0	2	0
Listeriosis	0	0	0	0	1	0.1	0	0	1	0.1	2	0
Lyme	0	0	1	0	1	0.1	0	0	1	0.1	3	0
Malaria	1	0.1	3	0.1	2	0.1	0	0	0	0	6	0.1
Measles	0	0	1	0	0	0	0	0	2	0.2	3	0
Meningococcal Disease	1	0.1	4	0.2	4	0.3	0	0	1	0.1	10	0.2
Mumps	0	0	0	0	6	0.4	1	0.2	1	0.1	8	0.1
Pertussis	42	6.3	278	12.4	129	8.2	42	8.8	68	6.4	559	9.3
Q Fever (All)	22	3.3	1	0	1	0.1	0	0	0	0	24	0.4
Rabies Post Exposure Prophylaxis	66	9.8	130	5.8	46	2.9	53	11.2	83	7.9	378	6.3
Rocky Mountain Spotted Fever	43	6.4	25	1.1	56	3.5	43	9.1	78	7.4	245	4.1
Salmonellosis	84	12.5	326	14.5	196	12.4	117	24.6	124	11.7	847	14.1
Shigellosis	4	0.6	56	2.5	19	1.2	7	1.5	3	0.3	89	1.5
Strep Disease, Group A Invasive	13	1.9	47	2.1	34	2.2	9	1.9	22	2.1	125	2.1
Strep Pneumoniae, Drug-Resistant	6	0.9	25	1.1	42	2.7	18	3.8	25	2.4	116	1.9
Tick-borne Diseases	122	18.2	102	4.6	127	8	104	21.9	227	21.5	682	11.3
Tuberculosis	12	1.8	46	2.1	33	2.1	5	1.1	8	0.8	104	1.7
Tularemia	3	0.4	3	0.1	6	0.4	10	2.1	14	1.3	36	0.6
Typhoid Fever	0	0	0	0	1	0.1	0	0	0	0	1	0
Varicella (Chickenpox)	50	7.5	34	1.5	79	5	13	2.7	53	5	229	3.8
Vibriosis	0	0	3	0.1	2	0.1	0	0	0	0	5	0.1
West Nile Fever	1	0.1	2	0.1	1	0.1	0	0	0	0	4	0.1
West Nile Virus Neuroinvasive Disease	2	0.3	11	0.5	9	0.6	0	0	3	0.3	25	0.4
Yersiniosis	0	0	3	0.1	2	0.1	7	1.5	0	0	12	0.2

Data Source: Missouri Health Information Surveillance System (WebSurv).

Rabies Testing Summary Maps

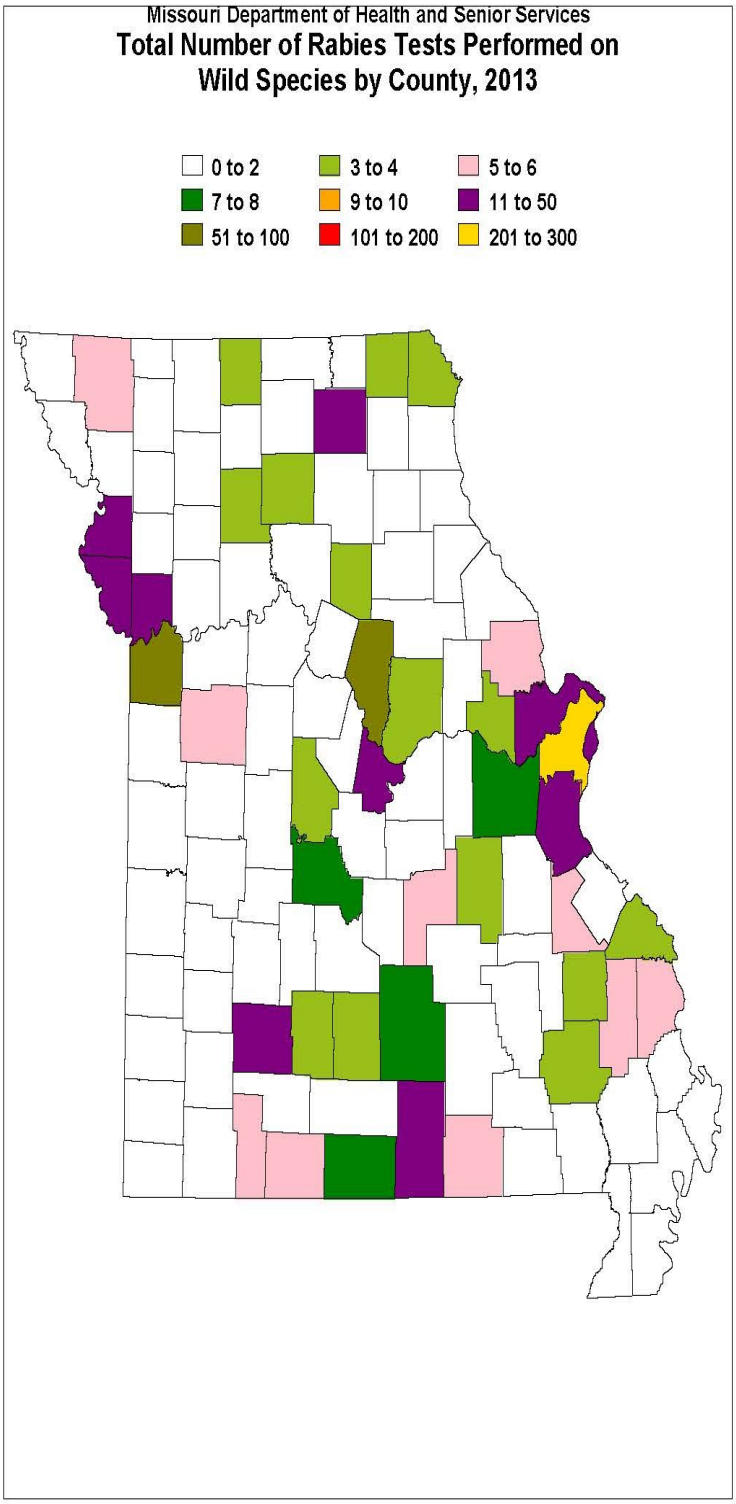




Rabies Testing Summary Maps

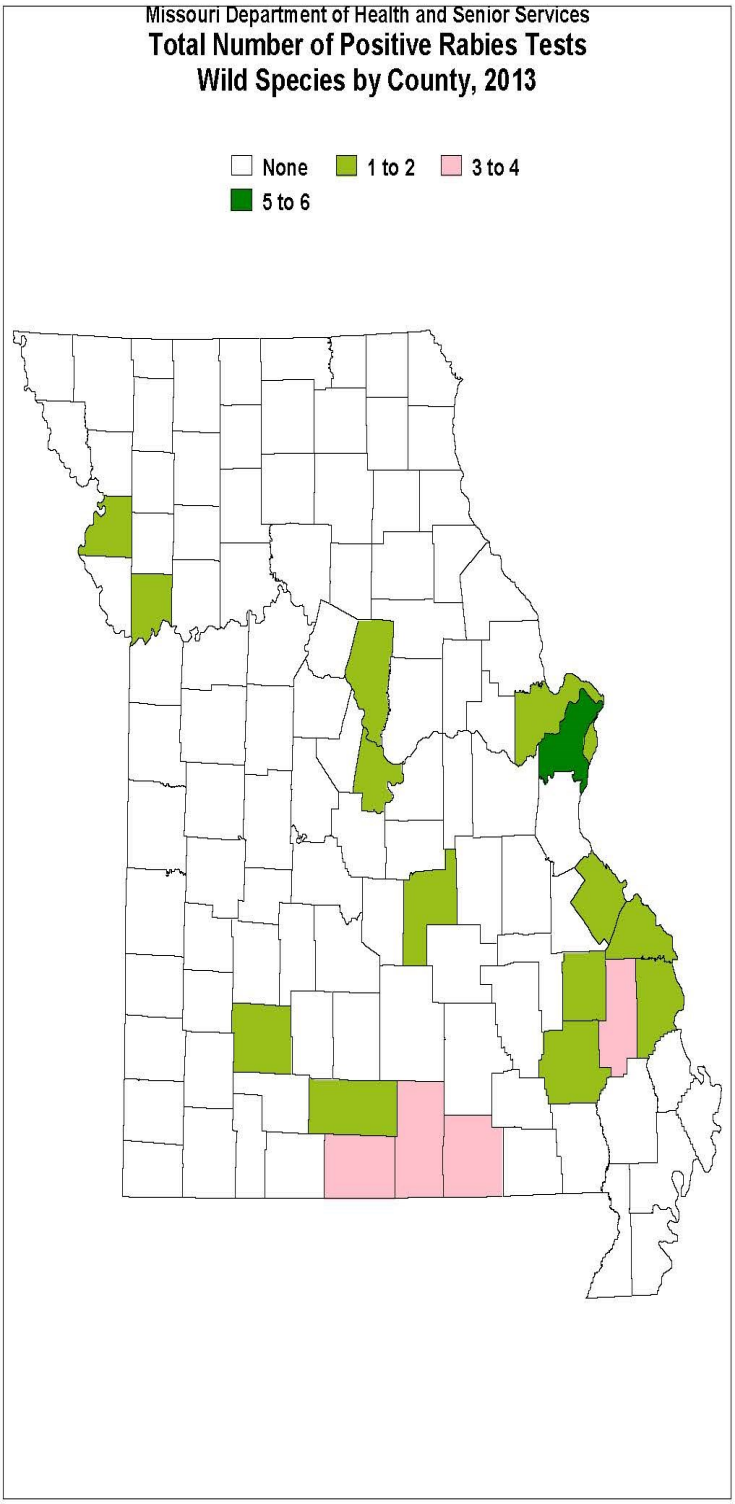
Missouri Department of Health and Senior Services

Total Number of Rabies Tests Performed on Wild Species by County, 2013

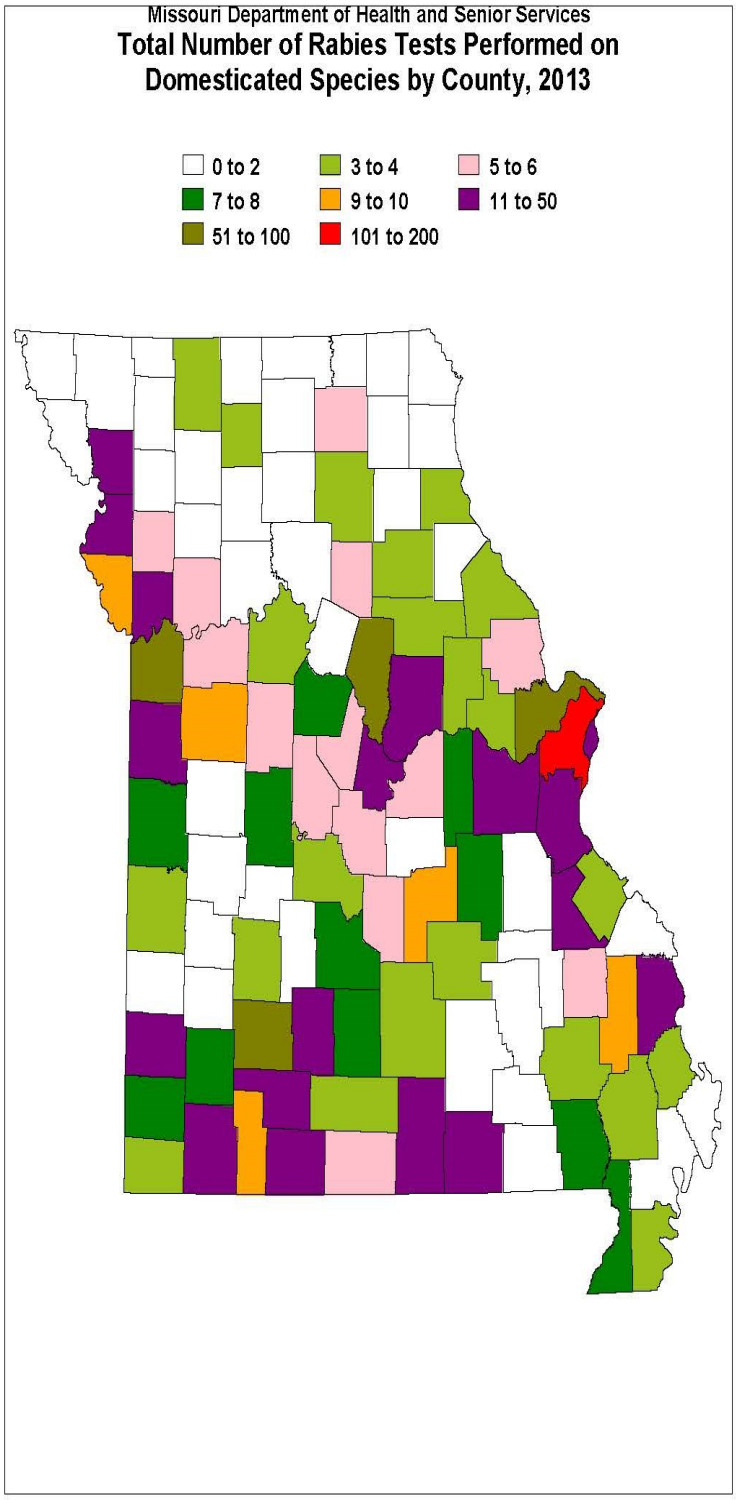


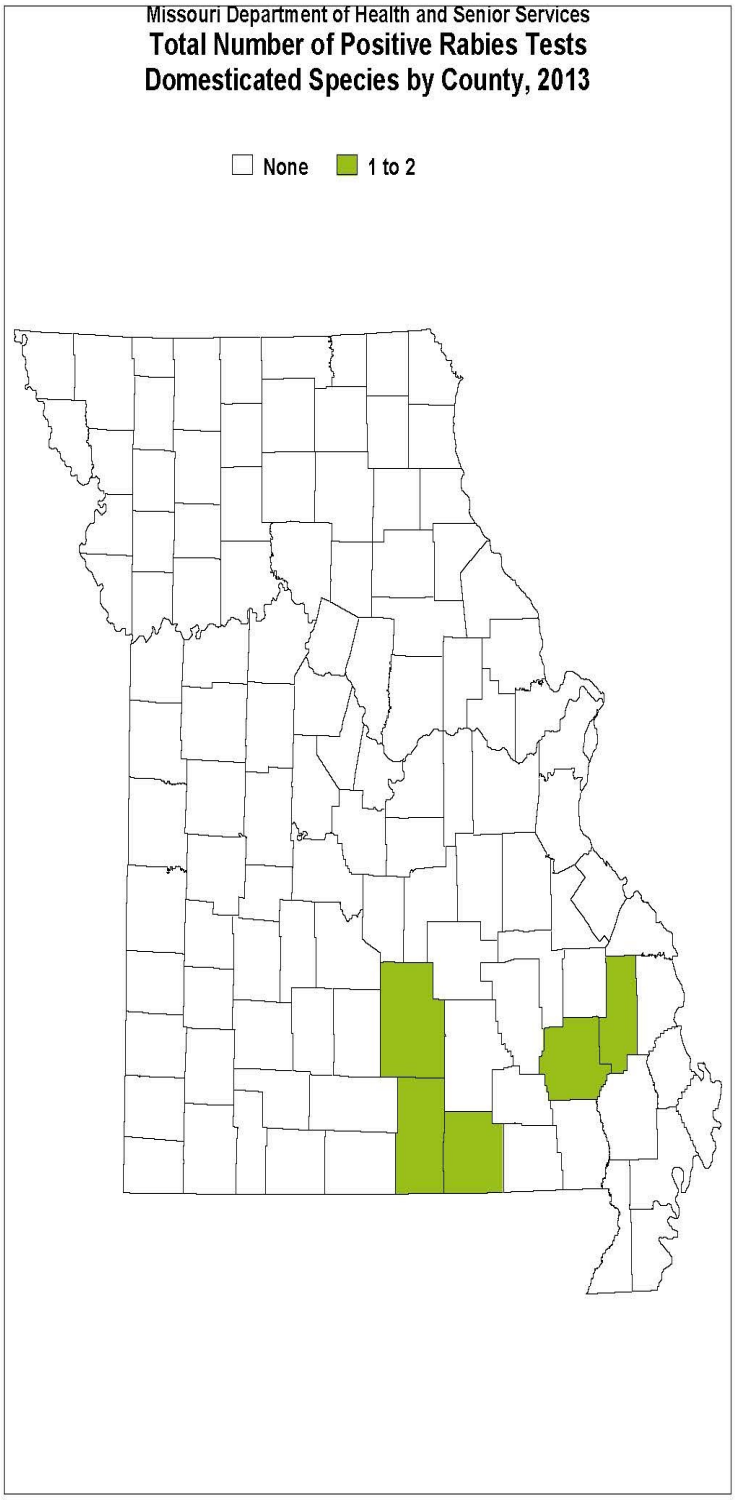
Missouri Department of Health and Senior Services

Total Number of Positive Rabies Tests Wild Species by County, 2013

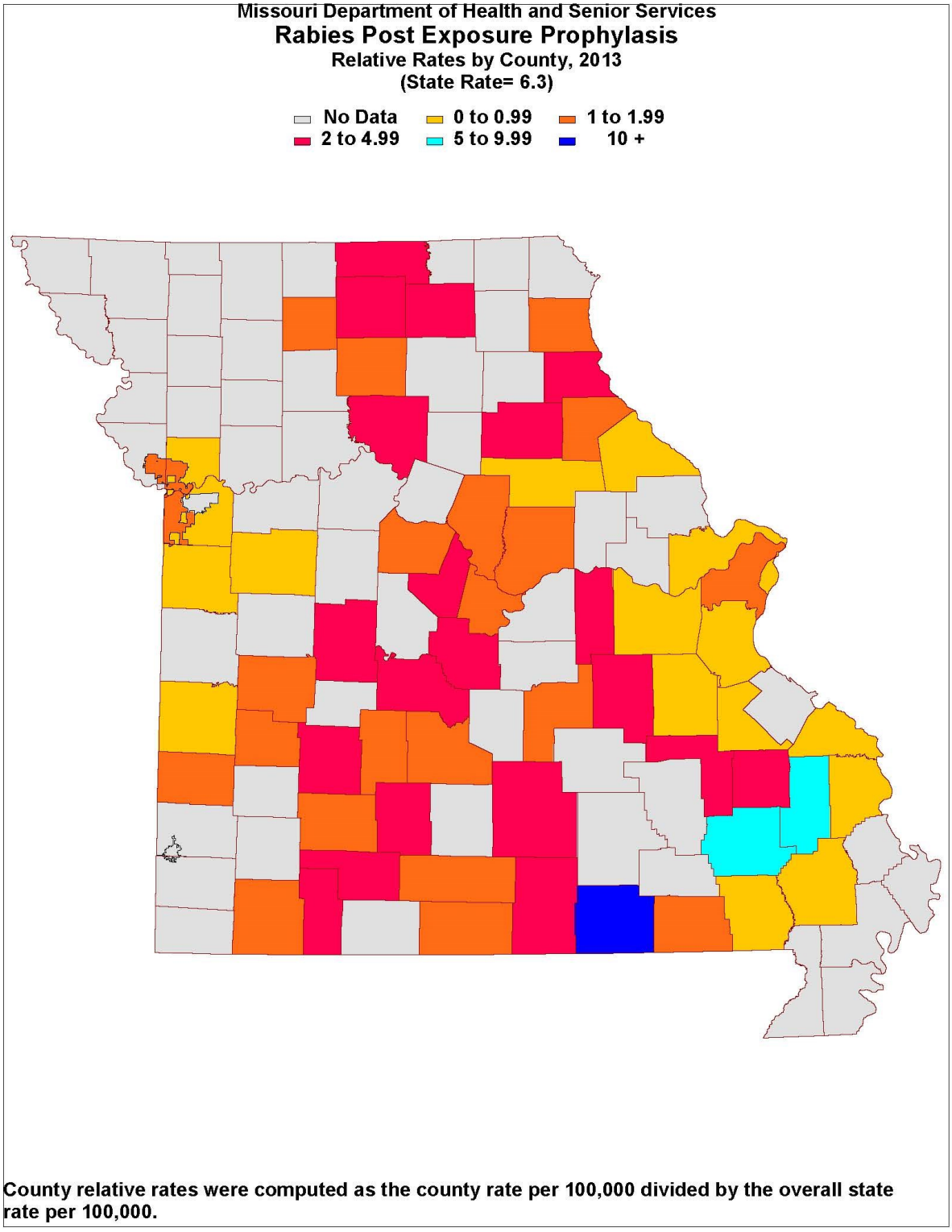


Rabies Testing Summary Maps





Rabies PEP Summary Map



County relative rates were computed as the county rate per 100,000 divided by the overall state rate per 100,000.